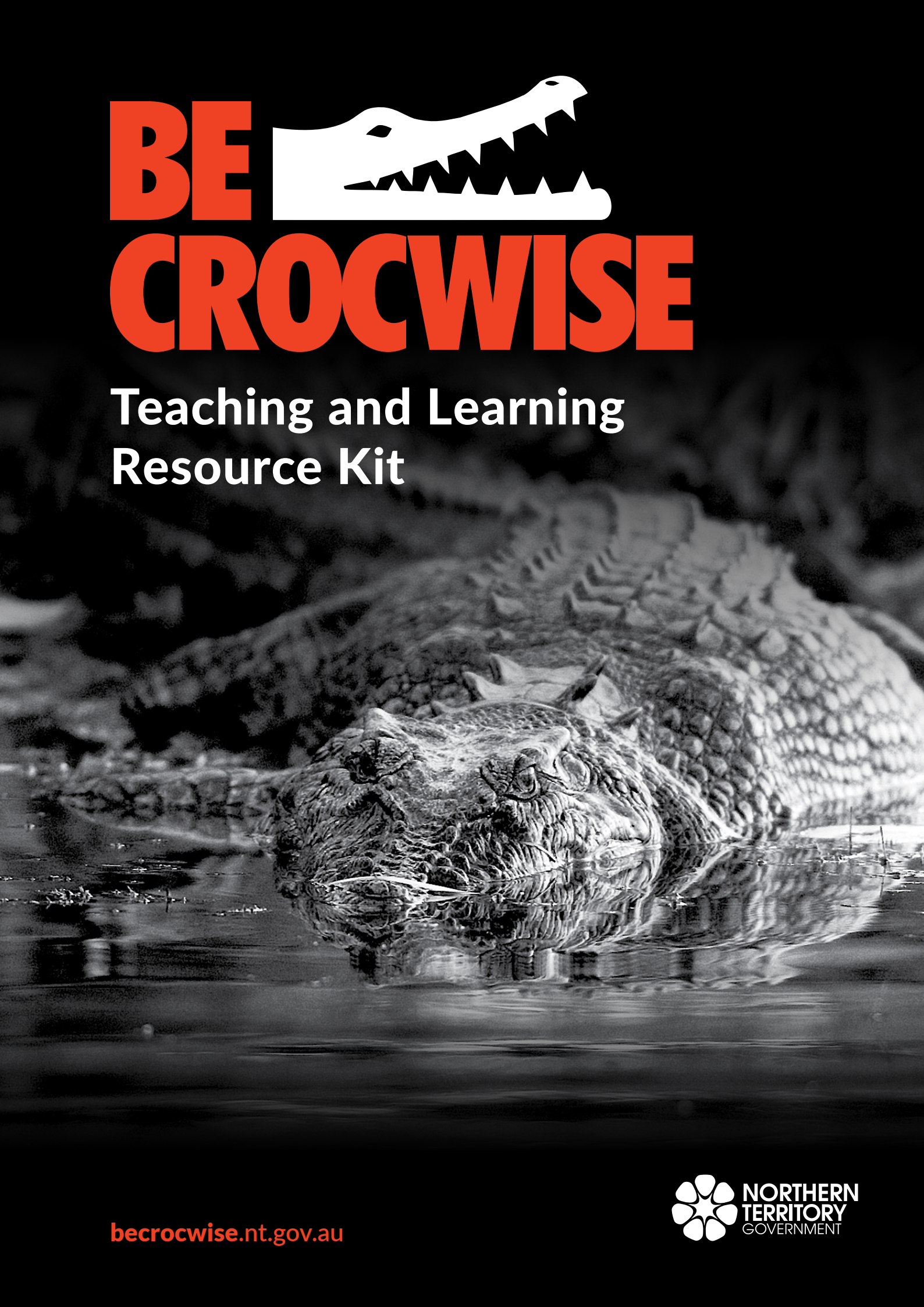
BE CROCWISE

Teaching and Learning Resource Kit



becrocwise.nt.gov.au

NORTHERN TERRITORY GOVERNMENT

Parks, Wildlife and Heritage
Department of Tourism and Culture
PO Box 1448, DARWIN NT 0800

INTRODUCTION

The Be Crocwise Teaching and Learning Resource Kit has been produced by the Parks, Wildlife and Heritage Division in the Northern Territory Department of Tourism and Culture.

The 2018 Be Crocwise Teaching and Learning Kit was developed by Jacelyn Anderson and Emily Findlay, with illustrations commissioned from Nicholas Pike. Most lessons in this 2018 kit were built around activities and illustrations in the previous kit, which was produced in 2007 by staff from the Community Education Unit. This kit has been updated to include current research about crocodile and human interaction and to address common behaviour which can influence the risk associated with saltwater crocodiles in the NT.

The Be Crocwise Teaching and Learning Kit was developed for NT teachers in early, primary and middle years to help educate their students about the risks of living in the Top End's croc country. The kit has been structured to help children internalise the Be Crocwise messages and behaviours so the risks can be lessened with simple changes in behaviour.

Parks, Wildlife and Heritage
Department of Tourism and Culture
PO Box 1448, DARWIN NT 0800

Website: www.becrocwise.nt.gov.au

To provide feedback on the Be Crocwise Teaching and Learning Resource Kit, contact the Parks and Wildlife Community Engagement Unit:

Darwin (08) 8999 4432
Katherine (08) 8973 8865
Email ParkManagement.Pwcnt@nt.gov.au

Report crocodile sightings to Parks and Wildlife by calling:

Darwin (08) 8999 4691 or 0419 822 859

Katherine (08) 8973 8888 or 0407 958 405

BE CROCWISE

Trigger Warning

Teachers presenting information and encouraging discussion about crocodile attacks should be aware that it could trigger reactions in people who have witnessed or been affected by such experiences.

Where possible, seek advice from the school community or local police.

CONTENTS

BE CROCWISE

The Northern Territory Government's Saltwater Crocodile Management Program was launched in 2016 to ensure the long-term conservation of the saltwater crocodile and its habitat in the Northern Territory while also keeping the public safe. Its active crocodile management programs include crocodile surveys, trapping and seasonally closing water bodies.

'Be Crocwise' is the program's public safety and education strategy.

This Teaching and Learning kit was developed for NT teachers and forms part of the Be Crocwise program. The Resource includes lessons and activities for each year level that can be completed as standalone lessons or as part of a larger unit of work. The lessons can also be modified to suit other year levels (for example, middle years students have enjoyed some of the early years lessons).

The Be Crocwise principles are:

> Saltwater crocodiles are common in the Territory and pose a significant risk to human life.
> People live and participate in recreational activities in or near waterways where saltwater crocodiles live.
> In areas where saltwater crocodiles live, there are no guarantees that a natural waterway is 100% safe.
> Follow all crocodile warning signs.
> Your safety is your responsibility.

Crocodile safety

The Territory Government gives this safety advice:

> Never swim where crocodiles may live. Only swim where signs say it's safe to.
> Always keep a look out for crocodiles. ***They'll see you before you see them.***
> Never provoke, harass, interfere with or feed crocodiles. *Crocs are dangerous, and it is illegal to interfere with wildlife.*
> Be extra vigilant at night and during the crocodile breeding season (wet season October–May). *Crocodiles are more active at night and will aggressively defend their mates and territory.*
> Stay well back from crocodile slide marks. *They are a sign that crocodiles are nearby.*
> Always stand a minimum of five metres from the water's edge. *Crocodiles can launch most of their body out of the water.*
> Be vigilant when launching or retrieving your boat, and avoid regularly using the same spot at the water's edge. *Crocs are ambush hunters and will watch and learn their prey's behaviour.*
> Do not lean over the edge of a boat or stand on logs overhanging water. *Crocs have been known to launch themselves up to half their body length out of the water.*
> Dispose of food scraps, fish offal and other waste properly and away from your campsite. *Crocs have an excellent sense of smell and will travel to find food.*

- Never prepare food, wash dishes or do activities near the water's edge or adjacent to sloping banks. *This behaviour is attractive to a hungry or territorial crocodile.*
- Camp at least two metres above the high-water mark and at least 50 metres from the water's edge. *Saltwater crocodiles will come out of the water if they smell food, and they have been known to approach campsites.*
- Do not interfere with crocodile traps—it is very dangerous and against the law. *These traps are baited to attract the animals.*

To teach school-aged children about crocodile safety, we simplified the Be Crocwise principles into five key messages. Each activity in this kit addresses one or more of these messages:

Be Crocwise

1. **crocs are common**
2. **crocs move around**
3. **crocs are deadly**
4. **crocs will see you before you see them**
5. **only swim in places signposted as designated swimming areas**

Introducing 'Be Crocwise' to your classroom

You can use this text to introduce the Be Crocwise messages to your class. You can also arrange a Be Crocwise presentation at your school.

You can expect to find saltwater crocodiles in all waterways across the Top End: shallow ones, deep ones, ones with lilies on top, muddy ones, and ones where we like to fish and swim. Rangers from the Parks and Wildlife crocodile management team remove saltwater crocodiles from some waterways close to major communities or if a crocodile could be a risk to people's safety. It's important to know that things have changed since crocodiles were protected in the NT in 1971. **Crocs are common now** because their populations have recovered since they were protected. There are now more than 100 000 saltwater crocodiles in the Top End, about as many as there were before commercial hunting started. That's a lot—nearly the same number of people living in Darwin or 10 times the population of Katherine.

There are two types of crocodiles in the Top End. Freshwater crocodiles (also known as 'freshies') and saltwater crocodiles (known as 'salties'). That saltwater name is a tricky one. Don't let it confuse you—salties are found in both fresh and salt water.

Crocodiles can be found in any Top End waterway at any time because **crocs move around**. They might be looking for food, a mate or territory. Crocodiles move around easily in the wet season because lots of rain means the rivers, creeks and billabongs start to join together—it's like a super highway for crocodiles!

Be careful when you're near the water, because **crocs are deadly**. They can grow really big and are excellent hunters. Some of their deadly features are:

> big powerful jaws that snap shut
> an extra set of eyelids to help them see underwater
> a great sense of smell
> the ability to sense movement in the water through their skin
> a strong tail to let them move quickly in and out of water.

Always remember to **Be Crocwise** if you're near the water. Only go in the water in designated swimming areas.

REMEMBERING ALL THESE MESSAGES WILL HELP YOU 'BE CROCWISE'.

HOW THE LESSONS ARE ORGANISED

This Be Crocwise Teaching and Learning Kit was updated in 2018 from an earlier version. You don't need any knowledge about crocodiles to use the kit: all content and activities have supporting information. For those who have used this kit before, the original activities have been embedded into scripted lessons, with leading questions and suggested answers.

The lessons and activities in the kit are separated into early, primary and middle years.

Each lesson contains:

> a materials checklist for teacher and student to assist in preparation
> lesson structures that fit with Visible Learning, including Learning Intentions, Success Criteria and Reflections
> a scripted lesson plan, including hooks, changing activities and suggestions for going further
> resources to support the lesson immediately following the lesson
> key words that are highlighted and include definitions (to support literacy and Word Walls).

Also in this kit:

> an overview of how each lesson links to the Be Crocwise messages
> an overview of how each lesson can link to the Australian Curriculum (depending on the teacher's focus)
> teacher notes with background information on saltwater crocodiles in Australia
> a resource list of websites and texts is available on our website which can be accessed by the following link: https://becrocwise.nt.gov.au/education-and-resources/teaching-and-learning-kits/resources. This link will be displayed throughout this booklet as *Be Crocwise Resources*

TEACHER NOTES

Classification

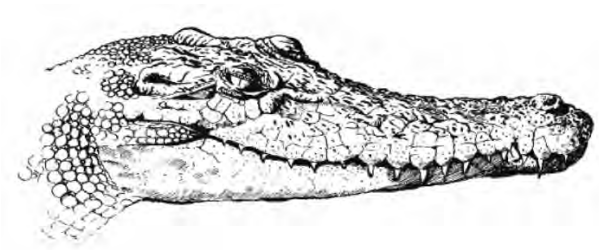
Crocodiles belong to the order of Crocodilian and family of Crocodilia. There are two species of crocodiles in Australia:

> the saltwater crocodile (previously known as the estuarine crocodile), *Crocodylus porosus*

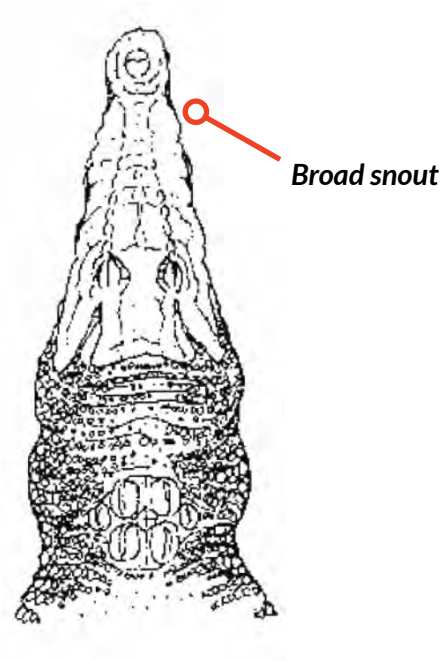
> the freshwater crocodile, sometimes known as the Johnstone's crocodile, *Crocodylus johnstoni*.

Worldwide, there are 13 species of crocodiles in the genus Crocodylus, and many of them are endangered.

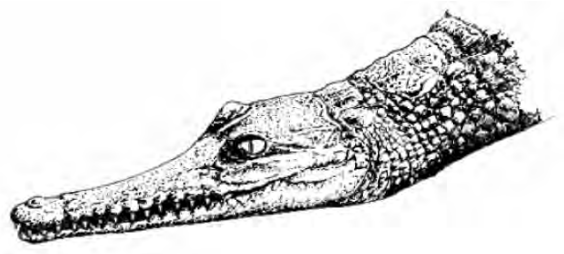
Saltwater crocodile
Crocodylus porosus



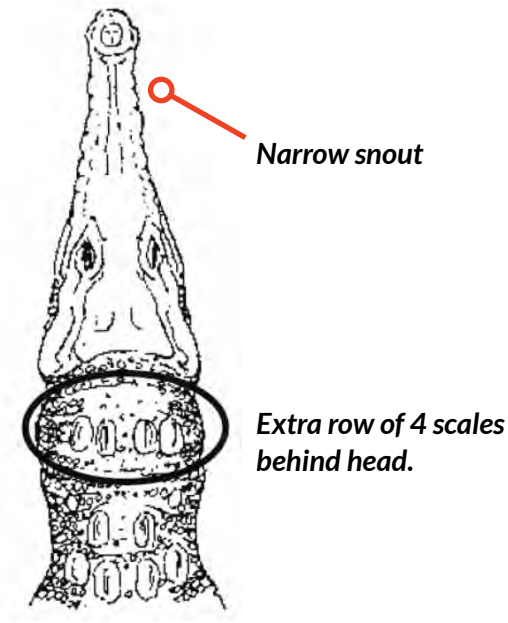
Have a broad snout with stout teeth



Freshwater crocodile
Crocodylus johnstoni



Have a long, narrow, tapered snout with needle-like teeth and ridges in front of their eyes



Saltwater crocodile
Crocodylus porosus

- live for more than 70 years
- can reach over 6 metres in length
- breed during the wet season (Oct–May), building a mound of mud, grass and other vegetation they lay their eggs in
- can attack unprovoked, including humans, cattle and horses
- will attack and eat anything it can catch, from fish and reptiles to large mammals
- found across northern Australia (NT, QLD, WA) and south-east Asia

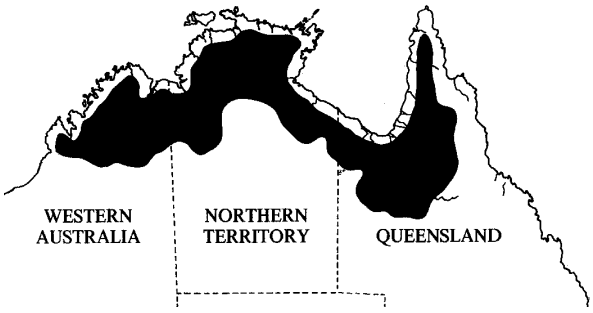
World Distribution of Saltwater Crocodiles

- occur in both freshwater and saltwater areas: billabongs, rivers, swamps, estuaries, beaches

Freshwater crocodile
Crocodylus johnstoni

- live for more than 50 years
- grow to 2.5–3.5 metres in length
- breed during the dry season (Aug–Sep), laying their eggs in a hole dug in sandy river banks
- usually timid but will attack humans in defence
- mainly feed on fish, crustaceans, insects, frogs, snakes and small waterbirds
- found across northern Australia (NT, QLD, WA) and endemic to northern Australia

Distribution of Australian Freshwater Crocodiles



- occur in freshwater rivers, streams and billabongs.

BE CROCWISE

THE SALTWATER CROCODILE IS THE LARGEST SPECIES OF THE CROCODILIAN ORDER AND THE LARGEST REPTILE IN THE WORLD TODAY.

Conservation and management in Australia

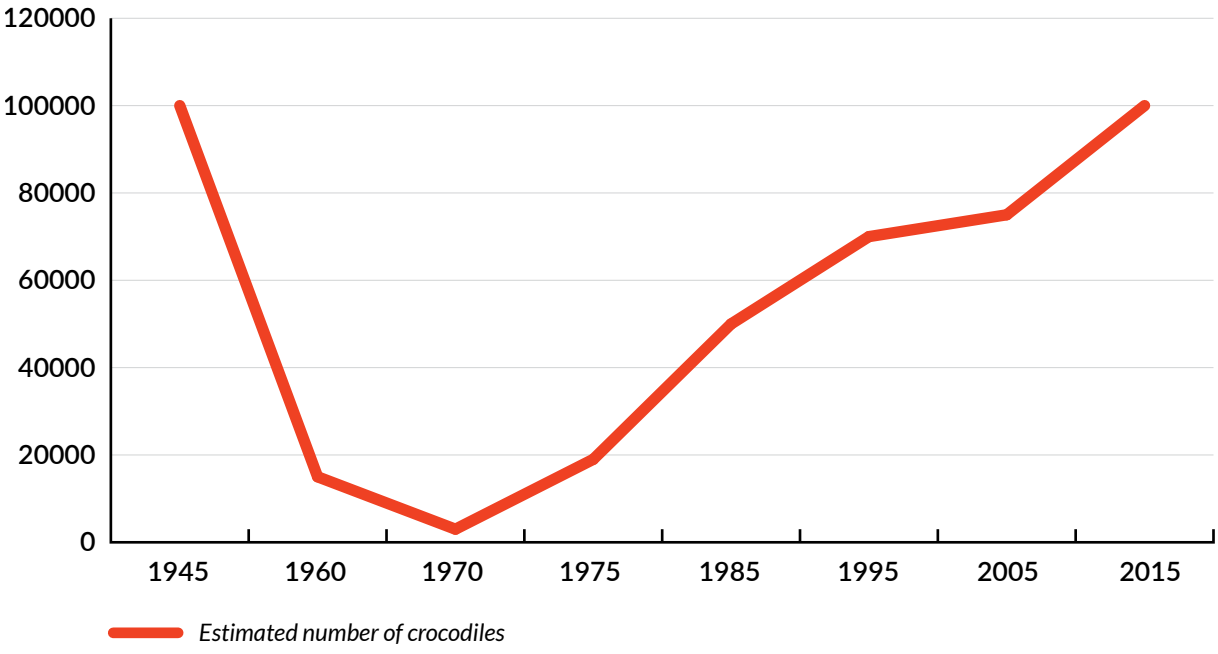
Unrestricted hunting of crocodiles was allowed from the 1940s to the 1960s. This hunting was lucrative for those involved, but it was done at unsustainable levels. By the early 1970s when hunting was stopped, it was thought that fewer than 3000 saltwater crocodiles were left in the wild.

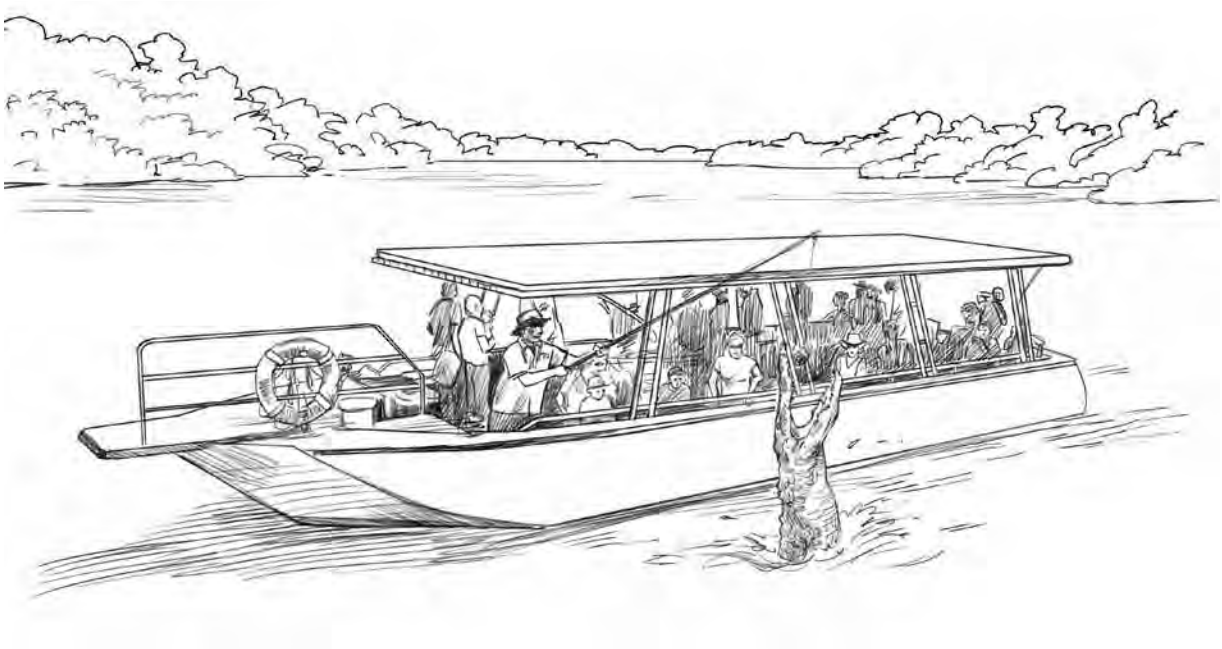
Saltwater crocodiles were declared a protected species in 1971. By the 1980s, their numbers had increased to 30–40,000.

As the population increased, so did the number of crocodile-related attacks.

How many crocs are there?

How numbers have changed over time





In the early 1980s, the Northern Territory Government implemented an 'incentive-driven conservation' strategy, to inform the public about the environmental and economic benefits of crocodile conservation. Positive incentives were created through commercial activity such as tourism and crocodile farming and negative incentives were countered by an active 'problem crocodile' control program.

Today, it's estimated there are 100 000 to 110 000 saltwater crocodiles in the Northern Territory. The Territory Government uses a risk-based approach to determine how crocodiles are managed in each area. This approach is based on assessing:

FREQUENCY: how often crocodiles are found in the area

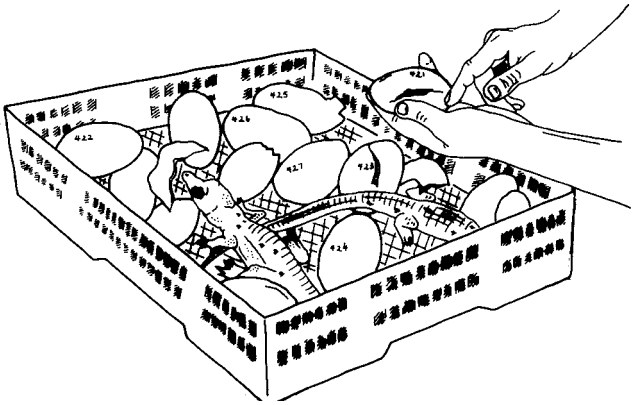
PROXIMITY: how close an area is to where crocodiles are known to breed

POPULATION: the number of people living in an area and how often they're there, including for recreation

PROBABILITY: the likelihood or chance of a human–crocodile interaction

PRACTICALITY: how accessible the area is and the risk to staff to access the area

The Northern Territory Government does not manage all areas in the Northern Territory (for example, Kakadu National Park is federally managed by Parks Australia), so management zones and signage may vary in some areas.



Commercial uses

Crocodiles, particularly the saltwater crocodile, are a huge drawcard for tourists in the Top End. Crocodile related tourism includes crocodile cruises and crocodile farms.

Although protected in the wild, crocodiles are farmed in the Top End and provide employment for hundreds of people in farms, tanneries and supporting businesses. The farms produce high-quality skins and meat for both the Australian and overseas markets. Products made from crocodile skins include belts, wallets, handbags and shoes. This industry relies on the harvesting of wild populations to support captive stocks.

The NT Government's Crocodile Management Program allows for crocodile eggs to be harvested from the wild each wet season. About half of this harvesting work is done by Aboriginal communities, a valuable source of income for remote areas.

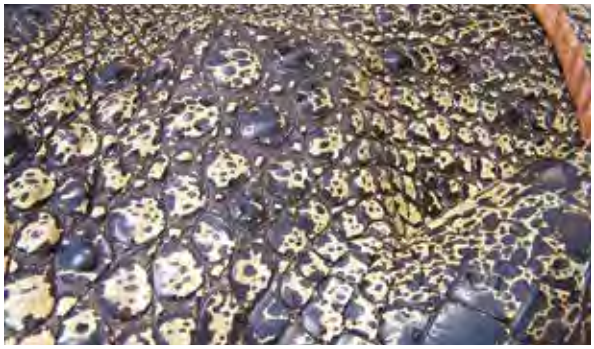
Evolution

- *350 million years ago:* reptilia first appeared. Reptiles are most closely related to birds.
- *245–228 million years ago:* crocodilians first appeared. These animals were lightly built animals, had long limbs and were bipedal (walked upright), modern day crocodiles provide a clue about this, as hind limbs are still longer than the front limbs.
- *161–99 million years ago:* known as 'crocodile time' because it's the period of the greatest diversity of crocodilians—more than 150 named fossil species have been recovered so far. These crocodiles ranged from giant dinosaur eaters and extremely long-snouted fish eaters to nearly toothless duck-billed forms, marine crocodiles with fish-like tails, dwarf crocodiles and land crocodiles. The basic crocodilian body plan has changed little over 200 million years.

Biology

Like all reptiles, crocodiles are ectothermic, which means they can't maintain a constant internal body temperature. Instead they must rely on an external heat source—like the sun—to maintain their body temperature (at 30 to 33°C). This body temperature is important for crocodiles to function; if they get too cold, they can't digest food and can die of starvation with a full stomach!

Crocodiles are often seen basking with their mouths open. It is thought that by doing so they can prevent their brain from overheating while the rest of the body continues to absorb heat.



A crocodile's skin is made up of a network of interconnected scales, of different types and sizes.

The scales on the flanks and the neck tend to be round with a raised centre.

Along the upper surfaces of the tail, the scales, or scutes, are raised and pronounced. The pronounced back scales known as osteoderms act like solar panels, getting a rich blood supply that transports heat back into the body when basking.

The scales on the belly are square and flat. This is the skin that is mostly used in the leather industry.

Saltwater crocodiles live in both fresh water and salt water, and their colour can change depending on the environment. Animals that have lived in freshwater rivers for most of their life tend to be darker. Sea-going crocodiles can have barnacles growing on their bellies.

As well as being excellent swimmers, crocodiles can walk on land at a speed of about 1 to 2 km/hr. They can have short bursts of speed, but these are rarely greater than 10 km/hr and they tire quickly.

Even though they are not swift walkers, salties can launch themselves up out of the water to catch prey much faster than people can react.

Female saltwater crocodiles nest during the wet season and are fiercely protective of their nest and young. A male crocodile may breed with several females and will actively prevent other males from entering his territory. Females will lay around 50 eggs, with hatchlings emerging 75 to 106 days later, depending on the incubation temperature. The sex of hatchlings is determined by the average temperature in the nest: 32°C produces only males, and lower temperatures (at or below 31°C) or higher temperatures (at or above 33°C) produce all females.

Feeding and diet

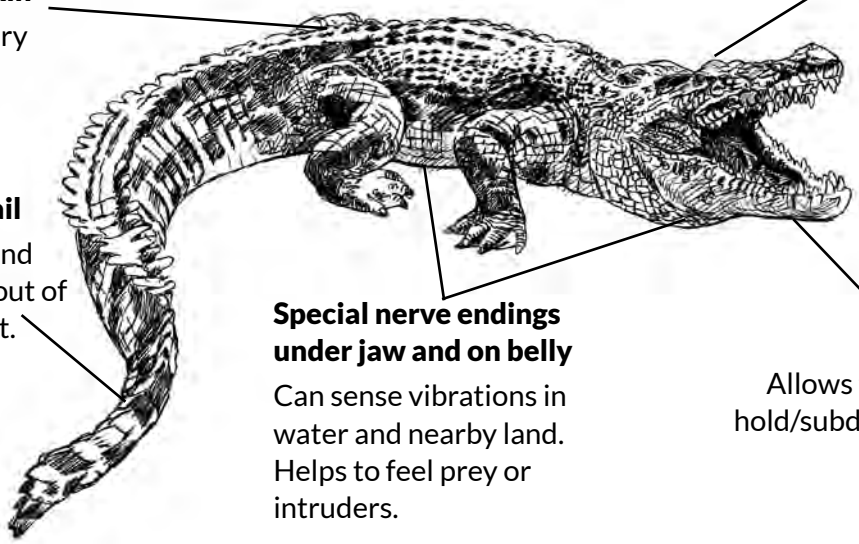
Saltwater crocodiles are ambush predators and will eat anything they can catch. Usually this is fish, turtles and crustaceans, but horses, buffalo, dogs and humans are also prey. Crocodiles have 66 teeth that are designed to grab and hold prey (if a tooth is lost, a replacement is waiting underneath). The teeth aren't designed for cutting, so crocodiles must break off pieces by performing a 'death roll', holding onto the prey and rolling over and over from their back to their belly. This roll can also be used to subdue prey.

Crocodiles have strong muscles for closing their jaws. Once they're closed, you can't prise them open. But the muscles that open the jaws are relatively weak, which is why a crocodile can't open its jaws if they are held/taped closed.

Surprisingly, crocodiles have small stomach (a three-metre crocodile's is about the size of a basketball), so they can't eat a large prey all at once. They may leave it and come back to feed on it over several days. Some crocodiles swallow hard items like stones to help with digestion (some birds do a similar thing). The stones may also help them be less buoyant in the water.

Saltwater Crocodiles have a number of features or adaptations that make them such successful hunters. The table below describes some of these features.

Type of adaptation	Feature	Benefit
Behavioural	Tuck feet to side when swimming Open mouth while basking Float with only eyes, ears and nostrils exposed Protective parental behaviour Territorial	Less water resistance Thought to prevent brain from overheating Can't be detected by prey Increases offspring survival rate Reduces competition for food/mates
Physiological	Rigid tissue at back of the mouth Closes nostrils Muscles allow fast burst of movement on land or in water Four-chambered heart, with valves that can redirect blood flow Raised scales on back and tail with rich blood supply Reduces heart rate to 2–3 beats per minute Special retina structure. Excellent hearing/smell Reserved teeth underneath external teeth Transparent second eye-lid	Closes off throat and prevents water entering when submerged Prevents water entering when submerged Able to surprise and catch prey Can increase blood flow where it's needed (e.g. for seeing/hearing) and away from non-essential areas to reduce oxygen use Act like solar panels to warm up body Allows them to spend a long time under water to wait for prey Allows crocodiles to see well in low light Can locate prey in low visibility conditions and from long distances Can replace lost teeth Enables them to swim with eyes open
Structural	See labelled image below	



Armoured skin
Prevents injury

Eyes close together and face forward
Can judge distance accurately, even underwater.

Flattened, muscular tail
Less water resistance and enables them to lunge out of the water and swim fast.

Special nerve endings under jaw and on belly
Can sense vibrations in water and nearby land. Helps to feel prey or intruders.

Powerful jaws
Allows them to crush and hold/subdue thrashing prey.

Aboriginal people and crocodiles

Aboriginal people of northern Australia have a long history with crocodiles and have learnt to live with them. This is demonstrated through stories, customs, songs and movies from across the Top End. Crocodiles also commonly feature in rock and bark paintings, as well as in more contemporary artworks.

It is difficult to give a general overview of the relationship between crocodiles and Aboriginal people due to clan differences. In addition, crocodiles are known by many names throughout the Top End; for example: Baru (Yolngu people from north eastern Arnhem Land), Kumoken (Naborn people from the Maningridia region of Arnhem Land), Marrachila (Burarra people from the Maningridia region of Arnhem Land) and Ginga (Gagadju people from the Kakadu region).

When talking about Aboriginal connections to crocodiles with your students, try to find out what crocodiles mean for the Aboriginal groups in your area:

> What is the word for crocodile in the local language?
> Do you know of any Aboriginal art or movies that feature crocodiles?
> Are there any crocodile cultural stories in your area?
> Identify if crocodile meat is eaten by some clans in your area or if killing of crocodiles is not permitted or is only allowed at certain times.

Some examples of Aboriginal connections to crocodiles are:

Larrakia

For Larrakia people from the Darwin region, the crocodile is a totemic animal that features in the logo of Larrakia Nation Aboriginal Corporation. Crocodile safety messages are embedded in the culture of daily life: never turn your back to the sea; the Old People watch while people go swimming; stay away from the water's edge; and you can smell those big crocodiles.

Yolngu

For the Gumatj clan of the Yolngu people in north east Arnhem Land, Baru, crocodile, is a spiritual guardian and is akin to the power of fire. The way fire rushes across the land is likened to the way a crocodile rushes to seize its victim.

Baru features in the movie 'Yolngu Boy' as the totem, emphasising the importance of the boy's tribal culture as they are taught Baru will protect them, make them strong and guide them through life.

Gagadju

For the Gagadju people, the traditional owners of Kakadu National Park, the crocodile is such an important icon that the Gagadju Association used it as inspiration for a major hotel in the park. Visitors enter the hotel through the crocodile's gaping jaws and sleep in its belly. Maintenance and service areas are located in the tail section.

Crocodiles inspiring art

The National Art Gallery of Australia currently hosts Darwin artist Joshua Bonson's painting 'Skin', which uses a circular design to represent the connections between the stones of the earth, the scales of a crocodile (his totem) and his family, including his Jawoyn connections. Find a link to view an example of Joshua Bonson's painting 'Skin' at http://cs.nga.gov.au/Detail.cfm?IRN=212992.

The winner of the Togart Contemporary Art Award in 2013 was Aly de Groot's 'Lucky - the Patron Saint for All Things Protected'. Her work involved intricately weaved ghost net fishing line, a crocodile skull, wire and a fish hook. It was inspired by the Territory Wildlife Park's 4 metre saltie 'Graham' while she was the resident artist there. Find a link to view an example of Aly de Groot's 'Lucky - the Patron Saint for All Things Protected' at http://www.alydegroot.com.au/index.php/galleries/.

A six-metre quilted saltwater crocodile was created by Susan Carlson. Named 'Crocodylus Smylus', her art took around two years to complete and was first shown in 2015. Nicknamed Stevie, in tribute to Steve Irwin, it has since travelled to exhibits in the United States of America and Australia. You can find links to a time lapse and blog detailing the process of Stevie's creation at http://susancarlson.com/project/crocodylus-smylus.

RESOURCES

The following resources are only a guide and not an exhaustive list of possible resources. We encourage you to find resources specific to your area, particularly those relating to Aboriginal culture. Newspapers across the Top End also regularly feature articles about crocodiles.

WEBSITES

NT Government: Be Crocwise - www.becrocwise.nt.gov.au
(Classification, Conservation and Management, Commercial Uses, Biology, Feeding and Diet, Adaptations, Safety, Photos)

QLD Government - https://environment.des.qld.gov.au/wildlife/livingwith/crocodiles/crocodile_plan.html
(Classification, Conservation and Management, Biology, Feeding and Diet, Adaptations, Safety)

WA Government - https://www.dpaw.wa.gov.au/plants-and-animals/animals/living-with-wildlife
(Classification, Conservation and Management, Biology, Feeding and Diet, Commercial Uses)

Crocodile Specialist Group - http://www.iucncsg.org/
(Classification, Conservation and Management, Commercial Uses, Biology, Feeding and Diet, Adaptations)

Crocodilians: Natural History & Conservation - www.flmnh.ufl.edu/cnhc
(Classification, Evolution)

NOVA Online: Crocodiles - www.pbs.org/wgbh/nova/crocs/clickable
(Classification, Evolution)

Convention on International Trade in Endangered Species (CITES) - www.cites.org
(Conservation and Management, Commercial Uses)

Australian Government - www.environment.gov.au/biodiversity/trade-use/index.html
(Conservation and Management, Commercial Uses)

Crocodylus Park - www.crocodyluspark.com
(Commercial Uses)

Crocosaurus Cove - www.crocosauruscove.com
(Commercial Uses, Research)

Big Gecko - http://big-gecko.com
(Pictures, Research)

MESA Living Safely with Crocodiles - www.mesa.edu.au/friends/croc_kit/default.asp
(Classroom Activities)

National Geographic Channel, for The Croc Catchers NT series - https://nt.gov.au/leisure/parks-reserves/be-crocwise-learning-materials-and-talks

Crocodile Island (Australian Crocodile documentary) Wild Things - https://www.youtube.com/watch?v=nqNKIgAfcSo

NON-FICTION BOOKS

Antill, Sara (2011) *A Crocodile's Life*. PowerKids Press, New York

Clark, Shawnie (2013) *Saltwater Crocodile: Wild Fun* CreateSpace Independent Publishing Platform, United States

Community Engagement Unit (2015) Crocwise Big Book. Parks, Wildlife and Heritage Department of Tourism and Culture, Northern Territory Government

De le Bedoyere, Camilla (2015) *Could a Crocodile Play Basketball… and other questions* QED Publishing, London

Gambino, Karlie (2013) *A Float of Crocodiles* Gareth Stevens Publishing, United States

Gibbons, Gail (2010) *Alligators and Crocodiles* Holiday House, New York

Gish, M. (2010). *Crocodiles*. Creative Education, Minnesota

Heller, Ruth (2004) *How to Hide a Crocodile & other reptiles* Penguin Young Readers Group, New York

Holden, P. (1993). *Crocodiles: The Australian Story*. Hodder & Stoughton, NSW

Jackson, Tom (2013) *Saltwater Crocodile* Bearport Publishing, United States

Kaufman, Gabriel (2007) *Saltwater Crocodile: The World's Biggest Reptile* Bearport Publishing, New York

Legg. G. (2004). *Scary Creatures: Crocodiles & Alligators*. Koala Books, NSW

Marsh, Laura (2015) *Alligators and Crocodiles* National Geographic Kids, Washington

Peguero, L. (2004). *Crocodile Attack!* BlueCat Books, VIC

Pope, Kristen (2016) *On the Hunt with Crocodiles*. Momentum, Mankato

Sartori, Breanne (2014) *Let's Learn About…Crocodiles: Amazing Pictures and Facts about Crocodiles* Createspace, USA

Stringer, C. (2006). *The Saga of Sweetheart*. Gecko Books, SA

Troupe, Thomas Kingsley (2015) *I want to be a Crocodile* Capstone Global Library Ltd, Oxford

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AUSTRALIAN CURRICULUM LINKS

	Key learning areas									General capabilities								Cross-curriculum priorities	
	Mathematics	English	Science	HASS	The Arts	Health and Physical Education	Literacy	Numeracy	Information and Communication Technology (ICT)	Critical and Creative Thinking	Personal and Social Capacity	Ethical Understanding	Intercultural Understanding	Aboriginal and Torres Strait Islander Histories and Cultures	Sustainability
EARLY YEARS (Transition to Year 3)															
Hide and Seek Masters	✓	✓	✓	✓	✓ Drama	✓ Being healthy, safe and active	✓			✓	✓				
Build a Croc		✓	✓	✓	✓	✓	✓			✓	✓				
Don't Come to Tea	✓	✓	✓	✓	✓	✓	✓			✓	✓		✓		✓
PRIMARY YEARS (Year 4 to Year 6)															
Time of Their Lives	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓		
Trapping for Safety	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓		✓		✓
Cranky Crocs	✓	✓	✓	✓		✓	✓			✓	✓	✓		✓	✓
Ultimate Predator		✓	✓			✓	✓			✓	✓				✓
Be Crocwise!		✓	✓	✓		✓	✓			✓	✓	✓	✓		✓

	Key learning areas						General capabilities							Cross-curriculum priorities	
	Mathematics	English	Science	Geography / History	The Arts	Health and Physical Education	Literacy	Numeracy	Information and Communication Technology (ICT)	Critical and Creative Thinking	Personal and Social Capacity	Ethical Understanding	Intercultural Understanding	Aboriginal and Torres Strait Islander Histories and Cultures	Sustainability
MIDDLE YEARS (Year 7 to Year 9)															
Following the Tracks	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓
When to Cage the Croc	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
It's all Connected		✓	✓			✓	✓			✓	✓	✓	✓		✓
Taking Sides		✓	✓	✓	✓ Drama	✓	✓			✓	✓	✓	✓	✓	✓
Risky Business (assignment)	✓	✓	✓	✓		✓	✓			✓	✓	✓	✓		✓
Croc Culture (assignment)		✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	

EARLY YEARS LESSONS

Suggested year levels

Transition to Year 3
(NB. activities can be modified up or down to suit other levels)

Teacher notes

The teacher notes (page 8-17 Be Crocwise Teaching and Learning Kit) give an overview of crocodile biology, adaptations, management in the NT and Aboriginal connections. These notes are the background knowledge a teacher needs to effectively use these lessons and activities.

Lessons

Be Crocwise messages

These lessons have been designed to reinforce the Be Crocwise messages about crocodile safety:

	Be Crocwise	Crocs are common	Crocs are deadly	Crocs move around	Only swim where signs say it's allowed
Lesson 1	✓	✓	✓		
Lesson 2	✓		✓		
Lesson 3	✓		✓		
Activities	✓		✓	✓	

Ideas for units of work

The activities can be done as standalone activities or incorporated into other units of work. Some unit topic ideas are:

- dangerous marine animals
- living with crocodiles
- iconic Australian animals
- reptiles
- living in the bush
- people who help me (i.e. rangers, police, paramedics).

LESSON 1 – HIDE AND SEEK MASTERS!

Teacher materials/preparation	Student materials
Image 1 and 2 : saltwater vs freshwater crocodile	Worksheets
Image 3: saltwater crocodile watching from water	Pen/pencil
Blackline master printed on grey or green paper crocodiles, cut out and hidden around the room – print enough for one per student	

Learning outcomes

Students:

- know there are two types of crocodiles that live in Australia
- can identify what a crocodile looks like
- know that saltwater crocs are deadly and that crocs are common
- understand that saltwater crocodiles are hard to see in the water and how they use this ability to hunt
- can identify people behaving dangerously and suggest how they could Be Crocwise with safe alternative behaviours.

Success criteria

Students have:

- discussed the differences between freshwater and saltwater crocodiles
- traced the waterline of a crocodile watching in the water, describing the body parts that sit above and below the water
- discussed why crocodiles are so hard to see in the water and how they hunt
- identified dangerous behaviour near a waterway and discussed ideas to help people stay safe.

Lesson introduction

Show students Image 1 and 2 of a freshwater crocodile and a saltwater crocodile. Ask students: Ask the students: did you know we live in crocodile country? Tell students that by the end of the lesson, they will know there are two types of crocodiles (point to images), they will understand why they are hard to see in the water, how they get their food and how people can **Be Crocwise** and stay safe while in crocodile country.

Class discussion

Point to Image 1 and 2 and ask students: do you know what these animals are?
ANSWER: Crocodiles.

Ask students: can you tell me the two different types of crocodiles that we have in the Northern Territory? *ANSWER: Saltwater and freshwater*

Both types of crocodiles live in Australia, but only one type is very dangerous to humans and can eat anything it can catch, from fish to kangaroos and even buffalo! This dangerous one is the saltwater crocodile.

The other type is called the freshwater crocodile. It only likes to eat fish, crabs, insects, frogs, snakes and small birds. Can you tell which crocodile is which? Can you see any differences between the two?

You and the students can circle the differences.

ANSWER:
Saltwater = wide snout with strong thick teeth (these teeth hold strong animals)
Freshwater = long, narrow snout with needle-like teeth (these teeth hold slippery fish).

Tell students: freshwater and saltwater crocodiles can be hard to tell apart. Treat any crocodile you see as dangerous—just in case. Saltwater crocs are deadly. If you live in crocodile country, crocodiles can be in any of the waterways. Crocs are common! Whenever there is lots of rain and the water comes up, the crocs move around and turn up in different places. That is why we need to always look out for crocodiles. But they are hard to see!

Ask students: who likes playing hide and seek? Saltwater crocodiles are hide and seek masters! They will see you before you see them. Show students the saltwater crocodile image from National Geographic, link found at *Be Crocwise Resources*.

Ask them: what colour is the crocodile? Does it match the colour of the river or beach? When an animal matches with its surroundings, this is called ***camouflage***.

Short activity/movement break

Hold up a pre-prepared paper crocodile. Tell the students there is one paper crocodile per student, like this, hiding around the room. Some are camouflaged and match their surroundings, so they will be hard to find. Once you find one, either help someone find theirs or come back to the mat/your desk.

When they find their crocodile they can try to spot the real thing in images from the Croc Stalker website, link found at http://crocstalker.com/spotthecroc.htm.

Discussion/worksheet

We have just learnt that a crocodile's camouflage makes them difficult to see. But they can also hide very well by sitting in water. Show students image 3a or 3b of a saltwater crocodile watching from the water. What parts of the crocodile sit above the water? What parts of the crocodile are hidden underneath?

Saltwater crocodiles are ***ambush*** hunters/predators (choose the appropriate term for your students). A crocodile is an ambush hunter/predator. This means the crocodile will sit and wait in one spot for its prey to come past. It is very good at staying still for a very long time so other animals forget that it is there. Then it explodes out of the water to catch its prey/food. This is why **crocs are deadly** and why they are so good at staying hidden. Some people don't know that they have to watch out for crocodiles in crocodile country. In your worksheet, you are going to spot people who are in danger and give them ways to Be Crocwise and keep them safe.

Hand out the Hide and Seek Masters! - Student worksheet

Step 1: students circle the differences they discussed earlier about freshwater and saltwater crocodiles.

Step 2: using the underwater crocodile picture students are to trace over the waterline and shade/colour in the area beneath the line.

More capable students can label the parts of the crocodile above and below the water (e.g. above = eyes, nose/nostrils; below = tail, legs, body, jaw). This could be more/less detailed depending on the students' ability.

Step 3: tell students to turn over to page 2 and have a good look at the **Be Crocwise** dangerous behaviours scene. There are people here who don't know how to Be Crocwise and stay safe from crocodiles. Students are to circle around or put a cross over anyone who is in danger.

For a more capable group, this task can be completed as a Think, Pair, Share activity.

Step 4: ask students if they can find and colour in the saltwater crocodiles hidden in the picture. Reiterate to the students that **crocs are common**.

Step 5: discuss the scene as a class. Ask students: what do you think the people in the dangerous behaviours scene could do to **Be Crocwise** and stay out of danger? How could they look out for each other? Look at the Be Crocwise safe behaviours scene below it for ideas. What behaviours are people doing to **Be Crocwise** and stay out of danger?

Role-play activity

Choose one or more of the scenarios in the scene for the students to role-play. Have the students, in small groups, role-play what they think could happen, with one student playing the role of a crocodile. Then role-play an alternative safe behaviour.

E.g.

Scenario 1: the overcrowded boat with one person dangling their hand in the water

Possible alternative safe behaviours: fewer people in the boat, all passengers keeping their hands inside, not leaning out.

Scenario 2: fishing knee-deep in water

Possible alternative safe behaviours: standing back from the water.

Reflection discussion

Discuss with students: today we talked about the differences between the two types of crocodiles we have here in crocodile country. Finish this sentence: **Crocs are…**
(students answer) ***common***.

What are the two different types of crocodiles called? *ANSWER: freshwater and saltwater.*

Which crocs are deadly to people? *ANSWER: saltwater.*

We understand that crocodiles are hard to see in the water and they like to stay hidden, so their food comes to them. What does camouflage mean? *ANSWER: an animal's colour, shape or pattern that helps it blend in with its surroundings.*

What else makes crocodiles hard to see in the water? *ANSWER: most of the crocodile's body sits under the water.*

You have spotted dangerous behaviours and come up with ways people can **Be Crocwise** and behave differently to stay safe. What are some of the ways people can stay safe in crocodile country? *ANSWER: various, but could include, stay out of the water/do not go swimming (unless there is a sign to say otherwise), do not hang arms or legs out of a boat, stand back from the water etc.*

Going further:

- Come up with a jingle or song to help students remember the Be Crocwise messages.
- Use photos, videos or models to talk about the body parts and behaviour that make saltwater crocodiles dangerous (and amazing!).
- Look at different safety signs in your area and interpret their messages (e.g. road signs, beach safety, school signs). Compare these with the crocodile safety signs. See pages 74, 76 and 78.
- Using one of the Be Crocwise messages, students can make their own sign to help people keep safe in crocodile country.

ACTIVITY 1 RESOURCES

Teacher materials/items for preparation

Saltwater vs freshwater crocodile

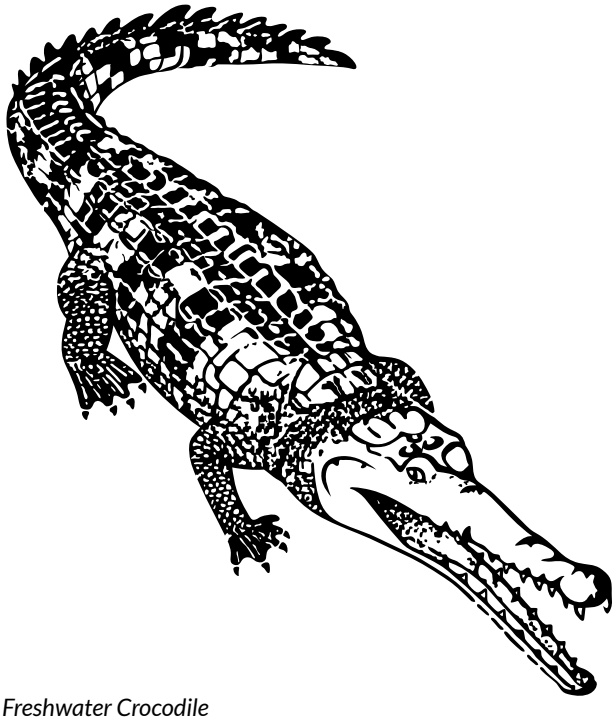


Image 1 Freshwater Crocodile

Distribution

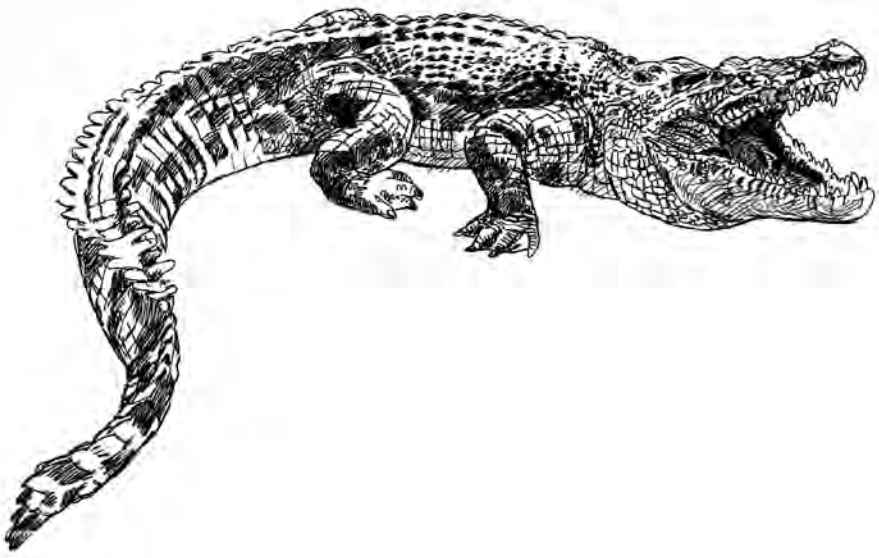


Image 2 Saltwater Crocodile

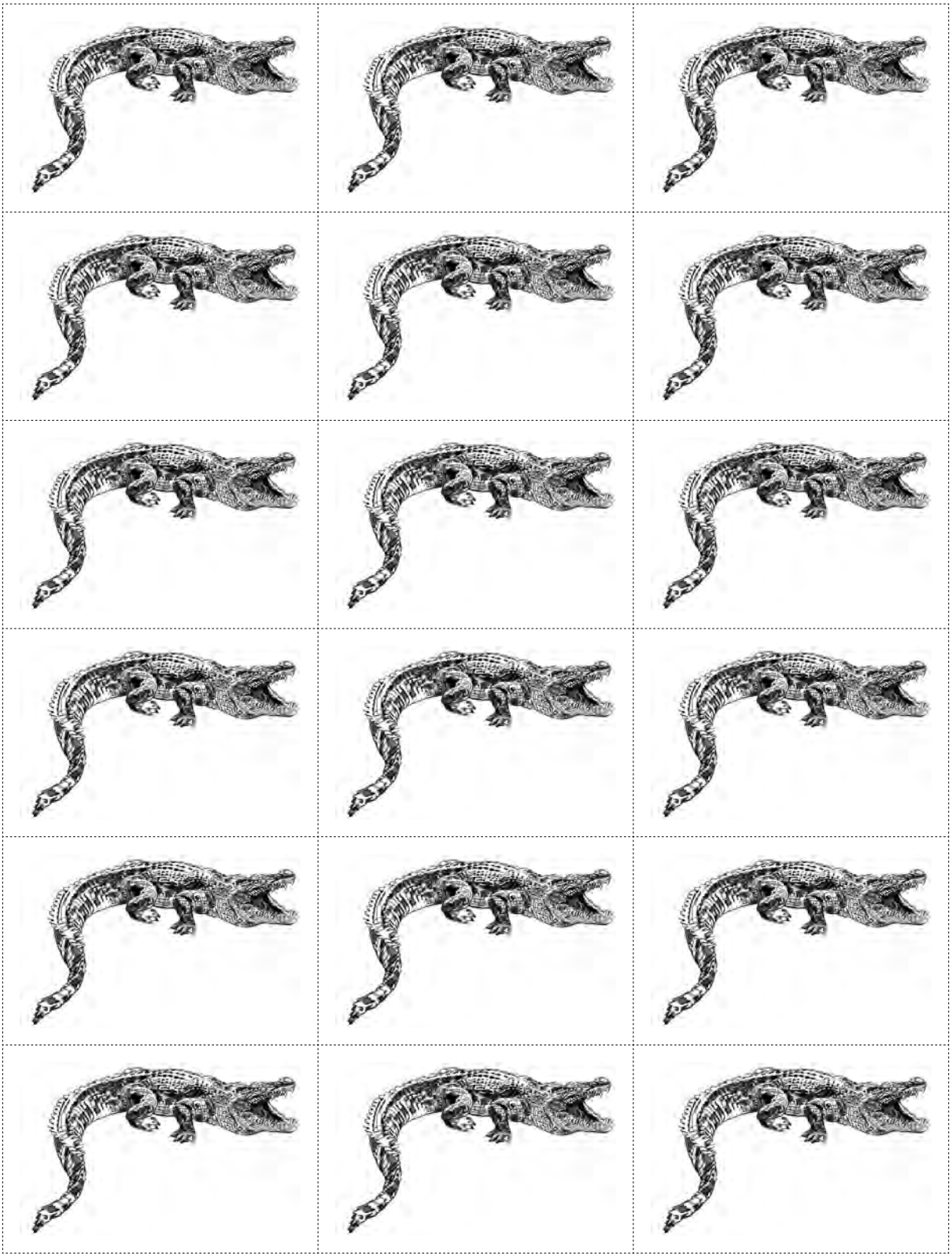
Distribution

Saltwater crocodiles watching from water

Image 3a Saltwater Crocodile watching from water

Image 3b Saltwater Crocodile watching from water

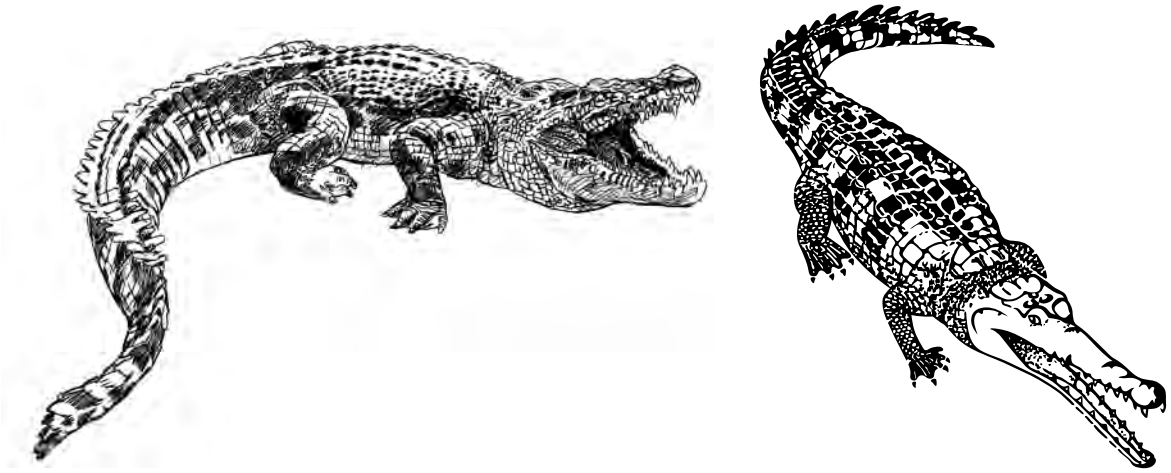
Blackline master 1 for printing little camouflaged crocodiles



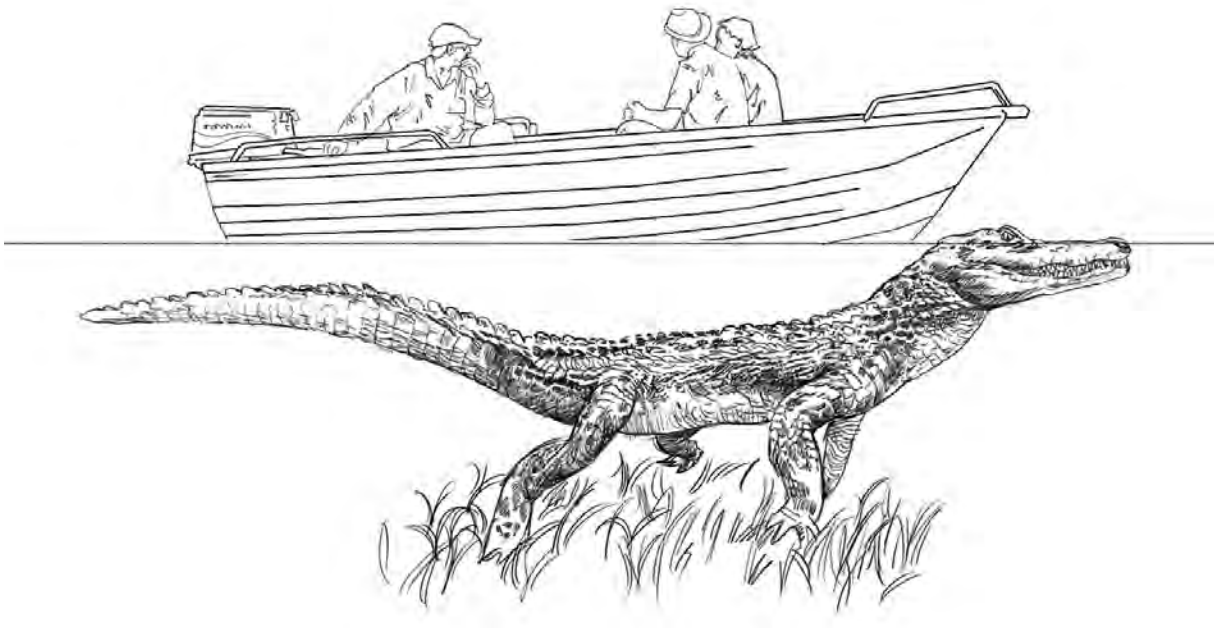
Hide and Seek Masters! - Student worksheet

Page 1

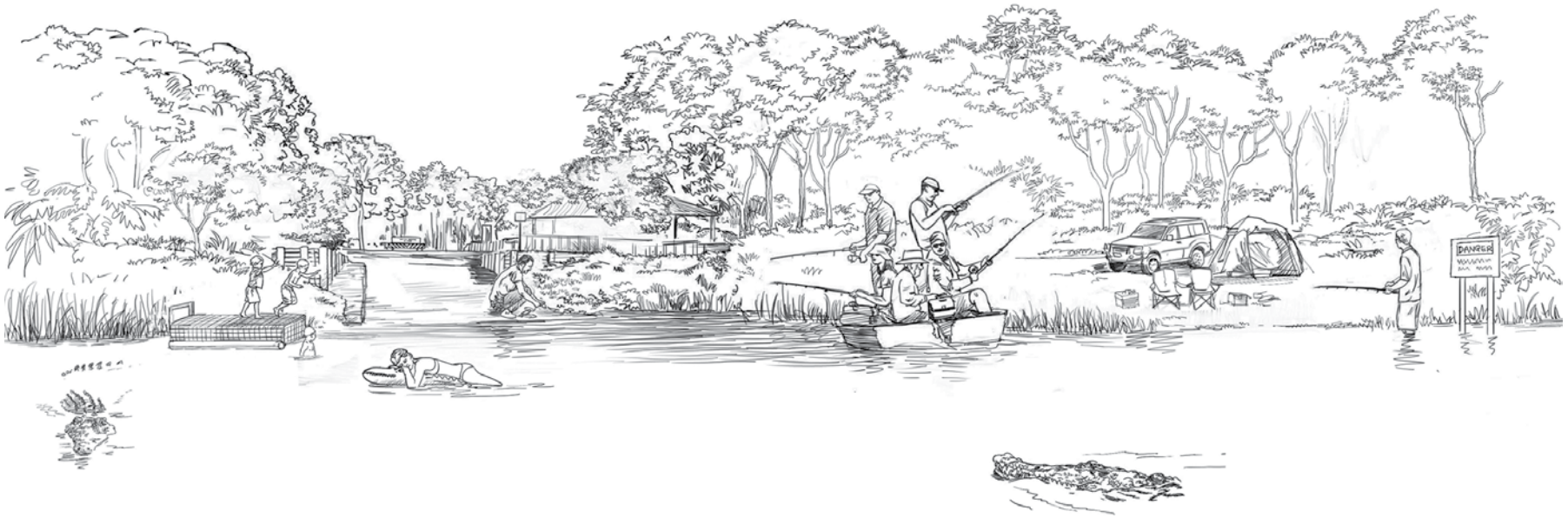
> Which one is the freshwater crocodile and which one is the saltwater crocodile? Label them. Circle their differences.



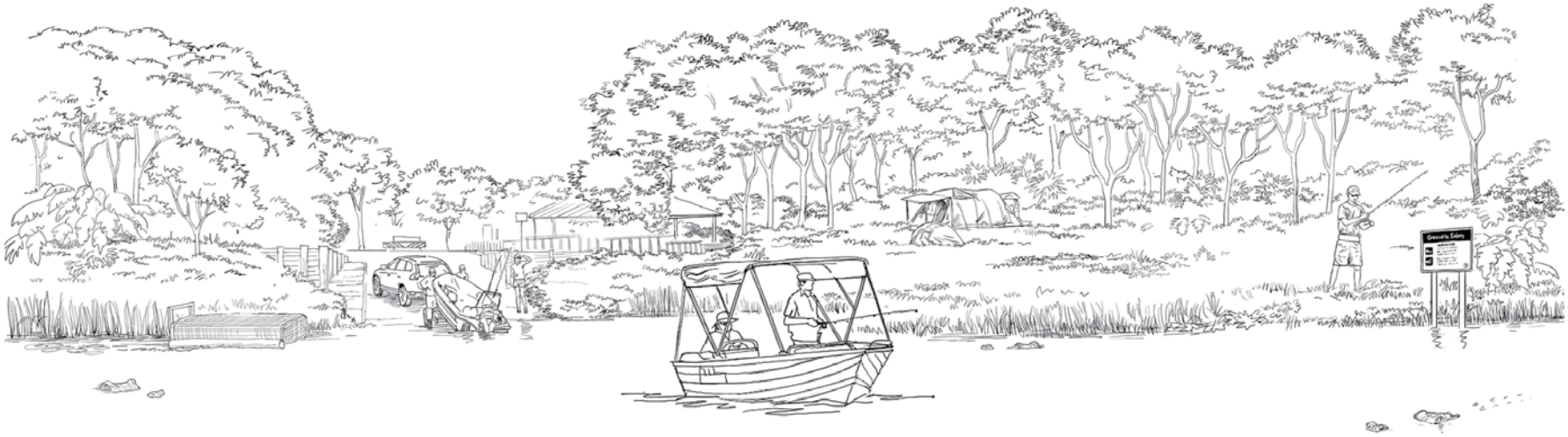
> Underwater crocodile. Draw a line along the waterline. Which parts of the crocodile are above and below the water? Label these parts.



Page 2 Be Crocwise dangerous behaviours



Be Crocwise safe behaviours



LESSON 2 – BUILD A CROC

Teacher materials	Student materials
Video clip: Be Croc Wise	Jigsaw puzzle*or play-dough for alternative activity
Puzzle worksheet - an enlarged (A3 size) jigsaw pieces of saltie parts	Scissors (if required)
Blue-tac/sticky tape to demonstrate puzzle	Glue

Learning outcomes

Students:

> describe a crocodile's physical features
> understand why crocodiles are amazing hunters/predators – crocs are deadly.
> understand the importance of safe behaviours in crocodile country.

Success criteria

Students have:

> completed the 'Build a Croc' puzzle
> labelled/described what makes a crocodile an amazing hunter/predator (i.e. physical and behavioural adaptations)
> discussed/described how they can stay safe in crocodile country.

Lesson introduction

Watch the video clip "Be Crocwise" on YouTube, link found at *Be Crocwise Resources*. Ask the students: did you know we live in crocodile country? Today we are going to talk about what makes crocodiles so amazing and so dangerous and how to **Be Crocwise** and stay safe.

Class discussion

Discuss with students: a crocodile is a hunter/predator.

Choose the most suitable word for your students' ability.

What does the word hunter/predator mean? A crocodile is an ambush hunter/predator. This means the crocodile will sit and wait in one spot for its prey to come past. It is very good at staying still for a very long time so other animals forget that it is there. Then it explodes out of the water to catch its prey/food! **Crocs can be deadly** to other animals.

Short activity/movement break

Instruct students to spread out around the room, lying down on their stomachs and being very still, pretending to be crocodiles. When you or a selected student calls out 'prey/food', the students/crocodiles jump up as quickly as they can, clapping their hands together and saying 'snap!'. You could make this a game by seeing who is the fastest crocodile.

Class discussion

Discuss with students: you have all just pretended to be crocodiles. What does a crocodile need to be able to hunt and catch its food/prey? Hold up cut-out pieces from the jigsaw puzzle as prompts. *Eyes, teeth, tail, legs, jaws etc.* All of these features help an animal to survive.

Activity

Tell students that they are going to build a crocodile.

Depending on students' abilities, this puzzle could be pre-cut or used to reinforce fine motor skills by using scissors, completed in groups or individually. NB: If students are not yet at this ability level, you could build a crocodile using play-dough/plasticine (see instructions on the resource page 37).

Holding up the jigsaw pieces from earlier, ask students how they would put these pieces together to build a crocodile. Hand out the puzzle worksheet and have students fit the pieces together to create their own crocodile. These can then be glued down. Have students label (verbally or written) the features of the crocodile.

Class discussion/role-play

Discuss with students: we have talked about what makes a crocodile such an amazing hunter/predator. Now how can we make sure crocodiles don't think of us as prey/food? We are going to act out different things people do that put themselves in danger. We are going to tell those people how to avoid danger in crocodile country.

Choose students to act out the following scenarios, with one person in the role of a crocodile. After each scenario, discuss what could be changed to keep people safe.

Scenario 1

Choose 3–4 students to act out a group of children playing with a ball next to a river. The rest of the class can pretend to be crocodiles lying in the river. As they are having more and more fun, the children move closer to the edge of the water. Ask the class what the 'crocodiles' might be thinking when they see the children coming closer to the water. What could the children do to stay safe from the crocodiles? *SAFE BEHAVIOURS: play away from the water's edge, always be watching out for each other.*

Scenario 2

Choose 4–5 students to act as a family. The rest of the class are crocodiles hidden in the creek.

It is a beautiful day, and a family is having a picnic by a creek. The sister and brother have found a crocodile trap. They have swum out to it and are standing on top of it. The trap has bait inside to trick a crocodile into going inside. Ask the class what the 'crocodiles' might be thinking when they see the children swimming to the trap and then climbing up onto the cage where the bait is. What could the children do to stay safe from the crocodiles? *SAFE BEHAVIOURS: stay away from crocodile traps—they attract crocodiles and there might be a crocodile nearby! Do not swim in the water.*

Scenario 3

Choose 4 students to act as a group of friends.

A group of friends are walking to the shops. They normally take a shortcut by jumping over a little creek. There has been a lot of rain recently and there is now too much water in the creek to jump over it. One of the friends starts to walk across through the water. *SAFE BEHAVIOURS: stay away from flooded waterways—these help crocodiles to move around.*

Scenario 4

Choose 5 students: 3 people fishing away from the water's edge and 2 fishing waist-deep.

The wet season has started, and the barramundi are hungry. It is a perfect time to go fishing!. *SAFE BEHAVIOURS: stay out of the water. Copy the people fishing away from the edge of the water.*

Reflection

Discuss with students: today we looked at why crocodiles are such skilled hunters/predators. **Crocs are…** (let students finish your sentence) deadly. We also labelled their features. Ask students to recall some of these.

We also came up with ways to make sure we stay safe in crocodile country. What were these safe behaviours?

Going further:

> As a class, make a life-sized model of a crocodile. Use craft materials such as cardboard, egg cartons (skin), foam, fabric, ping pong balls (eyes), bubble wrap (skin), stockings (webbed feet), paint, broken pencils (teeth) and crepe paper. Students make labels for the different body parts.

> Individually, students could create play-dough/plasticine models, labelling body parts with pre-labelled flags stuck onto toothpicks.

- Look at pictures of crocodile traps (refer to the Be Crocwise website) and talk about what they look like and why they are needed. Students draw a plan for their own version of a trap and then make a trap for their play-dough/plasticine crocodile.
- Have students sequence 'a day in the life of a saltwater crocodile' from a crocodile's perspective, of when it wakes up to when it goes to sleep. This story could first be collaboratively created by the class or teacher-prepared and given to them. Jumble up the story's sequence order, and have students put the story into the correct sequence. This story could also be presented with local languages

ACTIVITY 2 RESOURCES

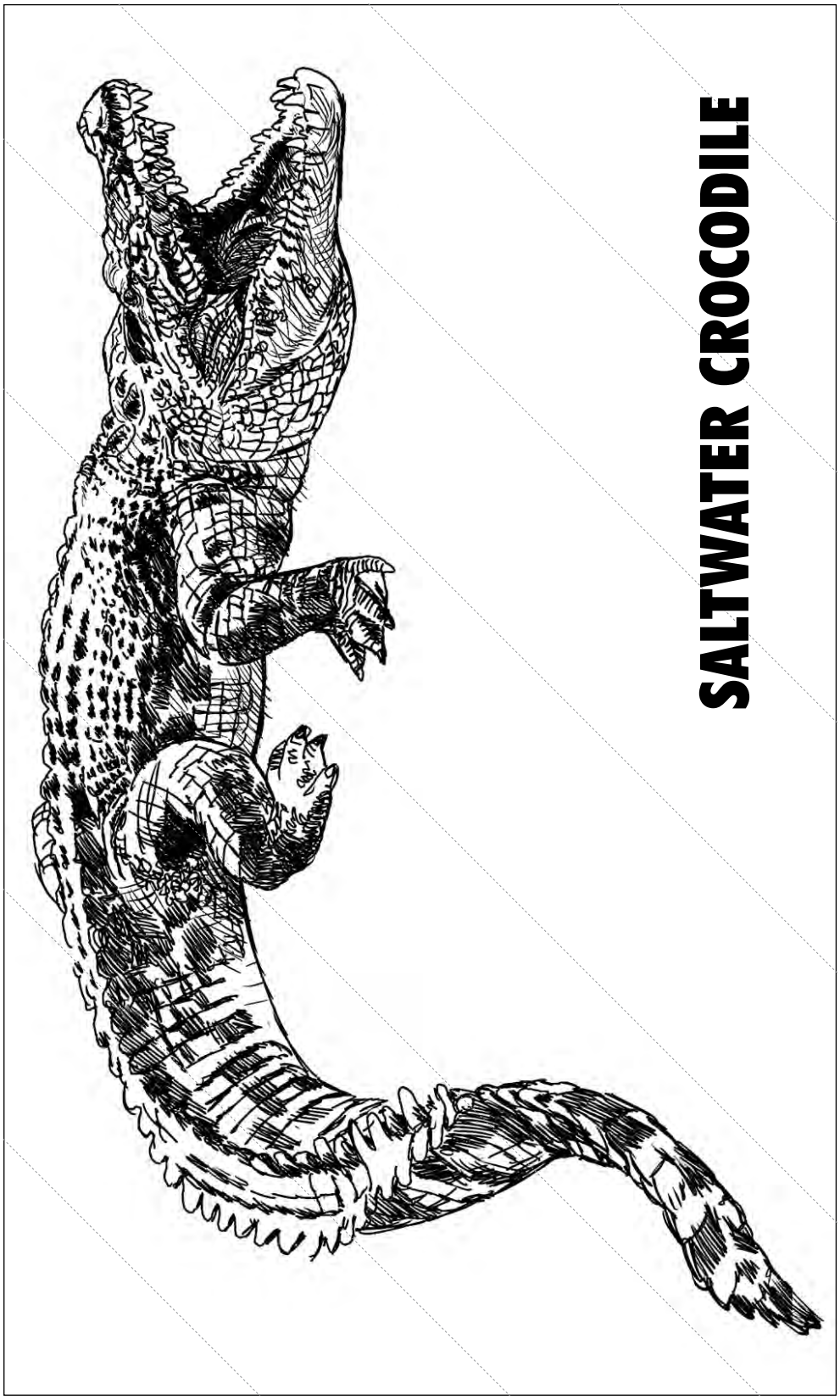
Play-dough crocs

- take portion of green play dough roughly 2 cm wide and as long as a pen
- roll dough into sausage
- halfway down sausage, squeeze 'back legs'—one each side of roll
- one-third down sausage, squeeze 'front legs'—one each side of roll
- just in front of front legs, shape end of dough into wedge shape for head
- just behind back legs, form length of roll into slightly pointed shape to make the tail and squeeze 'scutes' (the spiky scales down the crocodile's back) onto top of roll. Make one line of scutes halfway up tail from end then divide scutes into two lines—one on each side of tail
- Ta da! It should look like a croc!

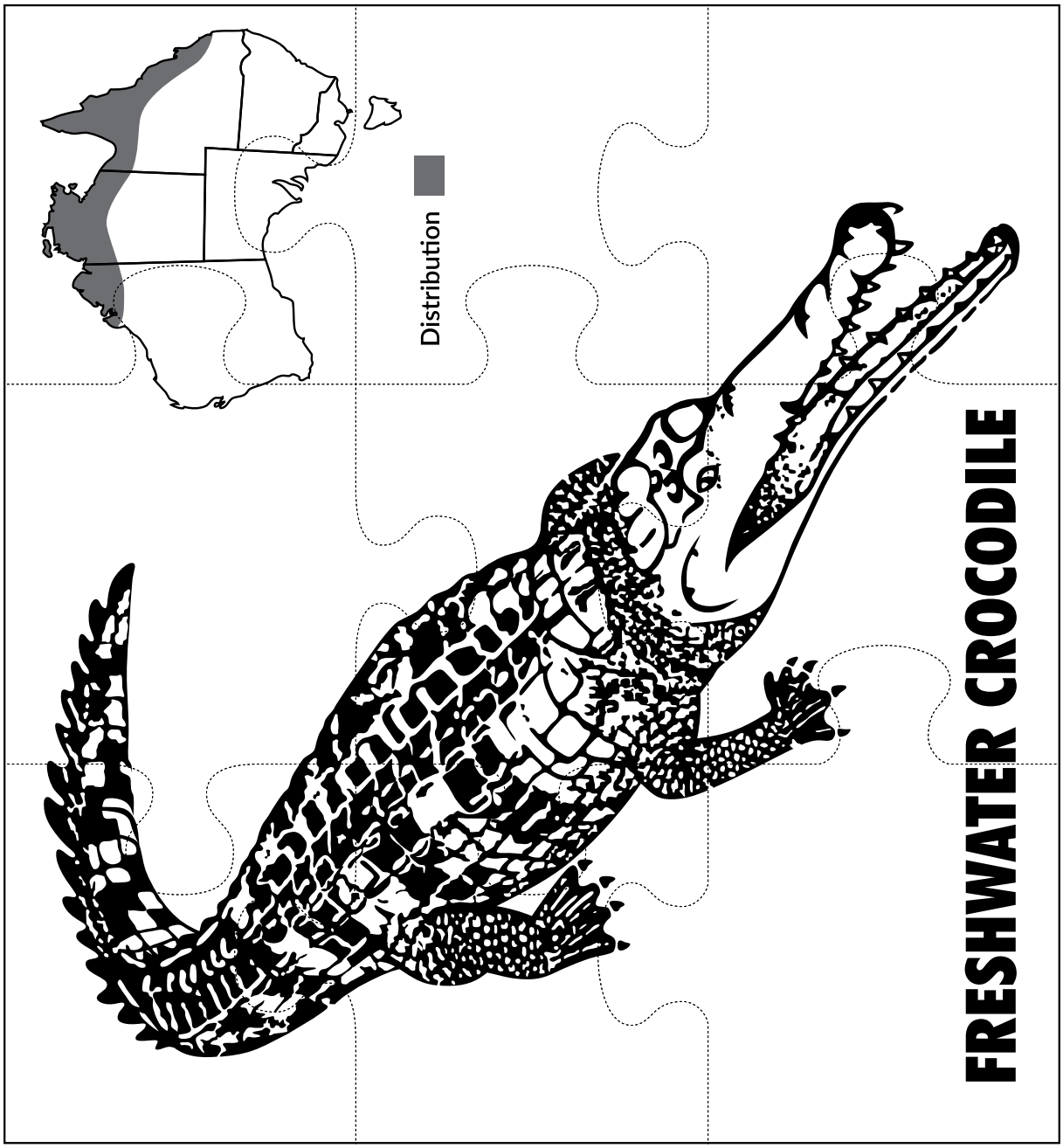
A link to a no-cook play-dough recipe can be found at http://theimaginationtree.com/2012/04/best-ever-no-cook-play-dough-recipe.html.

Jigsaw crocodile #1

Jigsaw crocodile #2



Jigsaw crocodile #3



LESSON 3 – DON'T COME TO TEA!

Teacher materials	Student materials
Whiteboard or similar	Food chain worksheet
Images: A5 size for teacher demonstration of a food chain (grass, wallaby, human, 2 x energy arrows) Blu-tac/sticky tape for this teacher demonstration on a whiteboard	Scissors
Images: A5 size for student food chain (grass, grasshopper, frog, 2 x energy arrows) Sticky tape or safety pins to attach images onto students during student-directed demonstration	Glue (if sticking into a book or onto paper)

Learning outcomes

Students:

> are able to describe why food is important
> can describe where crocodiles sit in their food chain
> understand that crocs are deadly
> can describe behaviours to Be Crocwise when visiting crocodile country.

Success criteria

Students have:

> contributed to a class brainstorm on why we and crocodiles need to eat
> created a food chain
> created and discussed ways that we can Be Crocwise and keep out of the crocodile's food chain.

Lesson introduction

Ask all students to think of their favourite food. Choose 5 volunteers (less/more depending on time!) who, without using words, can pretend to eat their food. The class can try and guess what it is. They have 3 chances to guess before they are told the answer.

Ask the remainder of the class to suggest their favourite foods, and make a list on the board with everyone's answer.

Ask students: do you think animals have favourite foods? We know that crocodiles like to eat other animals. What kinds of animals do you think a crocodile likes to eat?, make a list of suggestions on the board. We call these animals ***prey***. Prey are animals that are eaten by other animals. Ask your students to try to remember some of the crocodile prey animals for later on.

Explain to the class that every living thing needs energy to live. But do we know where this energy comes from? Energy comes from eating or creating food, and in this way, all animals and plants rely on each other to survive.

Short movement activity

Ask everyone to stand up and spread out around the room with enough space that they won't touch anyone else if they move their arms around.

Ask students to start the activity by squatting down into a ball. Give the following instructions:

> Energy helps us to ***grow***. Very slowly, move up from your ball shape, growing and growing to reach the height you are today. One day you will grow to be as tall as an adult—this is because of the energy you get from the food you eat!

> Staying in your spot, when I say 'go', wave your arms around and stamp your feet…'Go!'… 'Stop!' Energy helps us to ***move***. We would be stuck in one place if we did not have energy to move!

> Sitting down on the ground, close your eyes and relax. Breathe out as much as you can, then slowly take a big breath in…slowly breathe out…slowly breathe in. Energy helps us to ***breathe***. When we breathe, we get oxygen into our bodies.

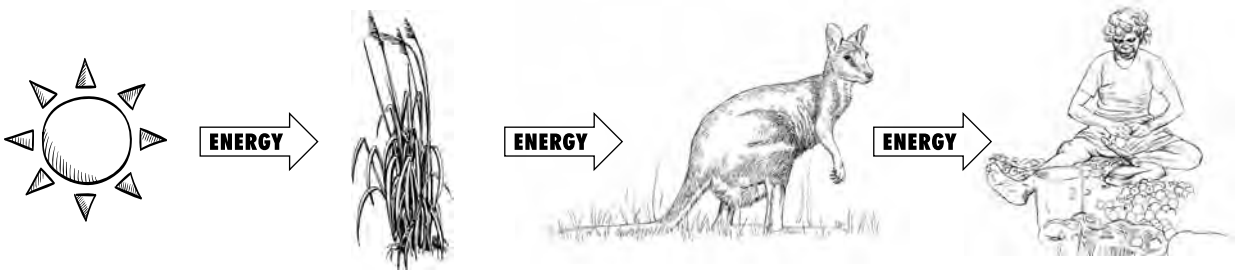
This breathing is a calming activity. Or you could ask them how long they can hold their breath for!

> Just like we need food to give us energy, so do crocodiles (and other animals).

Class discussion/activity

Discuss with students: almost every bit of energy on the planet comes from the sun. Plants turn this light energy into food energy. Then animals get this energy by eating plants (herbivores) or by eating other animals (carnivores). We can show how this energy moves from one living thing to another as food by using a food chain.

Show them the following example - Teacher demonstration of a food chain Place the sun, grass, wallaby and human images in order first, then highlight how the arrows show the energy direction. The sun provides energy to the plant, when eaten by the wallaby the plant provides energy to the wallaby and finally, when the wallaby is eaten by a human, it provides the human energy.



Ask for/select seven students to create a food chain. Using the A5 size images for the student food chain prepared earlier, stick the sun, frog, grass and grasshopper papers to four of the students and stick the energy arrows on the other three. Now ask the class how they think the following animals should be arranged to form a food chain. Where do the arrows go, and which way should they point? *Remind students to make sure the energy arrows point to the animal the energy is going into!*

It should look like this:

SUN ENERGY **GRASS** ENERGY **GRASSHOPPER** ENERGY **FROG**

Instruct students: now on your own, cut out and create your own food chain!
Hand out the worksheet.

NB: this could be done in pairs

Class activity/role-play (or alternative individual task)

Remind students that at the start of lesson they talked about what kinds of animals they thought a saltwater crocodile would like to eat. Crocodiles hunt by watching and staying hidden so they can sneak up on their prey.

They wait quietly before moving very quickly (exploding!) to catch their prey (ambush). **Crocs are deadly**. Ask students if they think that people could sometimes accidentally act like a crocodile's food/prey? Select students to role-play the following scenarios. One person will need to be the crocodile. Everyone else has to come up with ideas to stop these people acting like food/prey.

NB: alternatively, students could choose one of these scenarios and draw a picture of how people could instead Be Crocwise.

Scenario	How could the crocodile see this?	How people can change things so they do not act like prey/ food. (Various answers possible)
People are camping nearby the bank of a creek and some are going down to the same spot on the creek again and again (one time to get some water, another time to wash hands, another time to wash dishes etc.).	Prey keeps coming to the same place—this must be a good spot to catch prey/food! I'll just sit and wait for it to come back.	Bring your own water. Wash hands and dishes away from the water's edge. Camp back from the water's edge. Don't keep doing the same things at the water's edge.
People are swimming by the edge of a creek, splashing around and making noise.	Animal in trouble (splashing around)—this is going to be easy food/ prey!	Keep out of the water. Do not swim in crocodile country! (unless the area has a designated swimming area sign)
People are fishing. Some of them are up to their waist in the water.	Prey/food are just standing in the water! This will be easy to catch; I can sneak up on them.	Keep out of the water. Stand 5 metres back from the water when fishing: a crocodile can jump 2/3 of its body length—up to its tail—out of the water!) Stand behind a rock or other obstacle when fishing from the water's edge.
There is a man cleaning his fish in the water by the boat ramp.	Smells like food! I'll hang around here and get something to eat.	Do not enter the water at boat ramps. Clean fish well away from the water. Dispose of fish waste by burying a long way from the waters edge, in fish bins if provided or take it away with you.

Reflection questions

Ask the students: What do we get from our food? *ANSWER = energy*

It is because of energy that we are alive!

What are three things we use this energy for? *ANSWERS = e.g. growing, moving around, breathing (there are many different answers)*

What does a food chain show us? *ANSWER = where energy goes to—what eats what.*

Have you created a food chain yourself?

We live in crocodile country. **Crocs are deadly**—and very good at catching their food. We came up with some ways to **Be Crocwise** and stay out of the crocodile's food chain so we're not prey/food. What were some of these ways to Be Crocwise?

Going further:

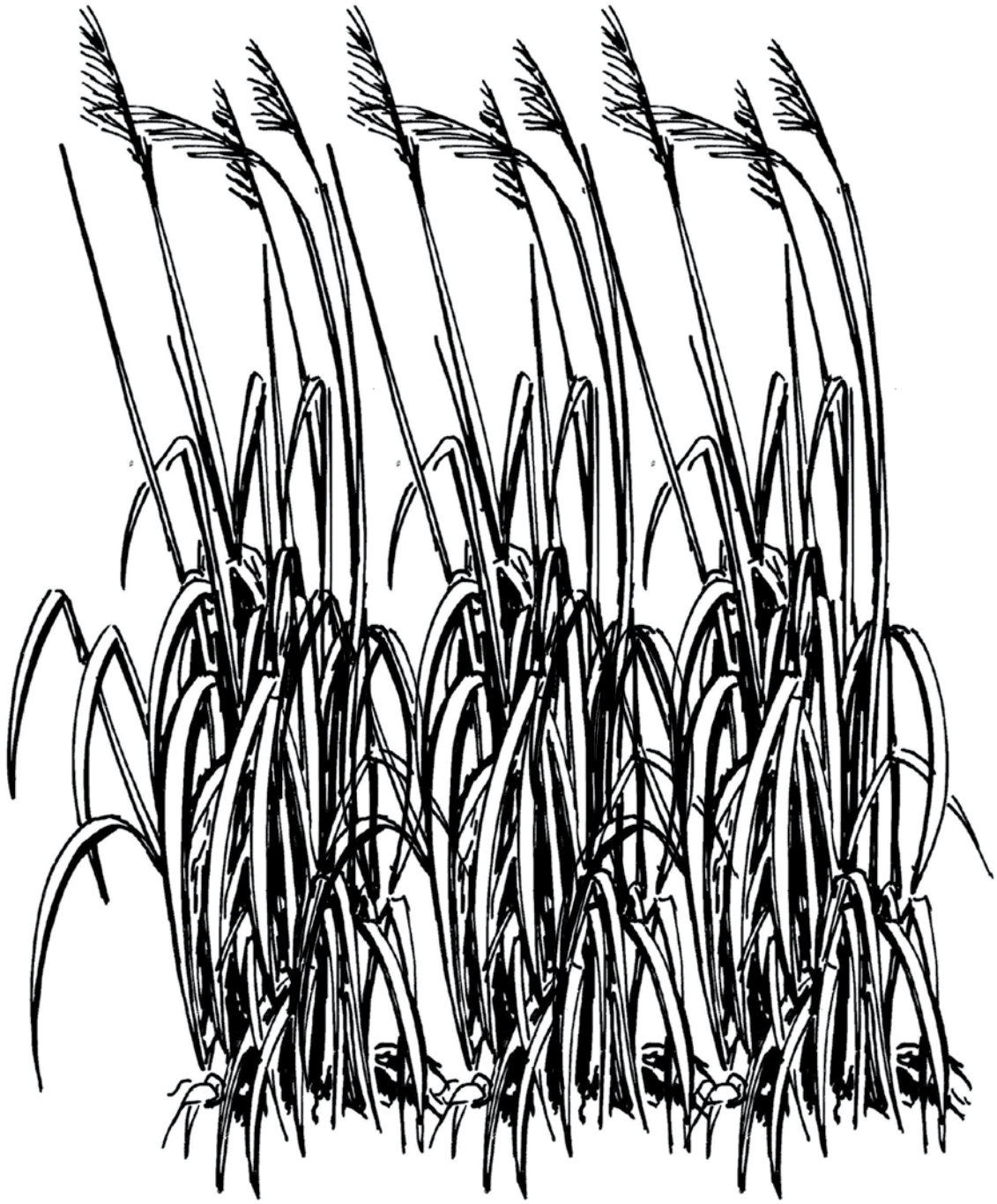
- Formalise the students' role-plays and perform or record for an audience, highlighting how people can keep safe in crocodile country.
- Create a classroom display of the saltwater crocodile food chain.
- Draw some other short food chains in the Top End (e.g. fly → frog → snake → eagle)
- Students keep a food diary of what they are eating and compare their diet to other animals.
- Talk about the features of a crocodile that make them good hunters (refer to teacher notes). Compare these features to other hunters (e.g. lion, shark).
- Talk through what adaptations each animal in the food chain needs to be able to catch its food (e.g. underwater breathing, fast swimming, big teeth).
- Build a mobile to show a food chain or web for a crocodile.

LESSON 3 RESOURCES

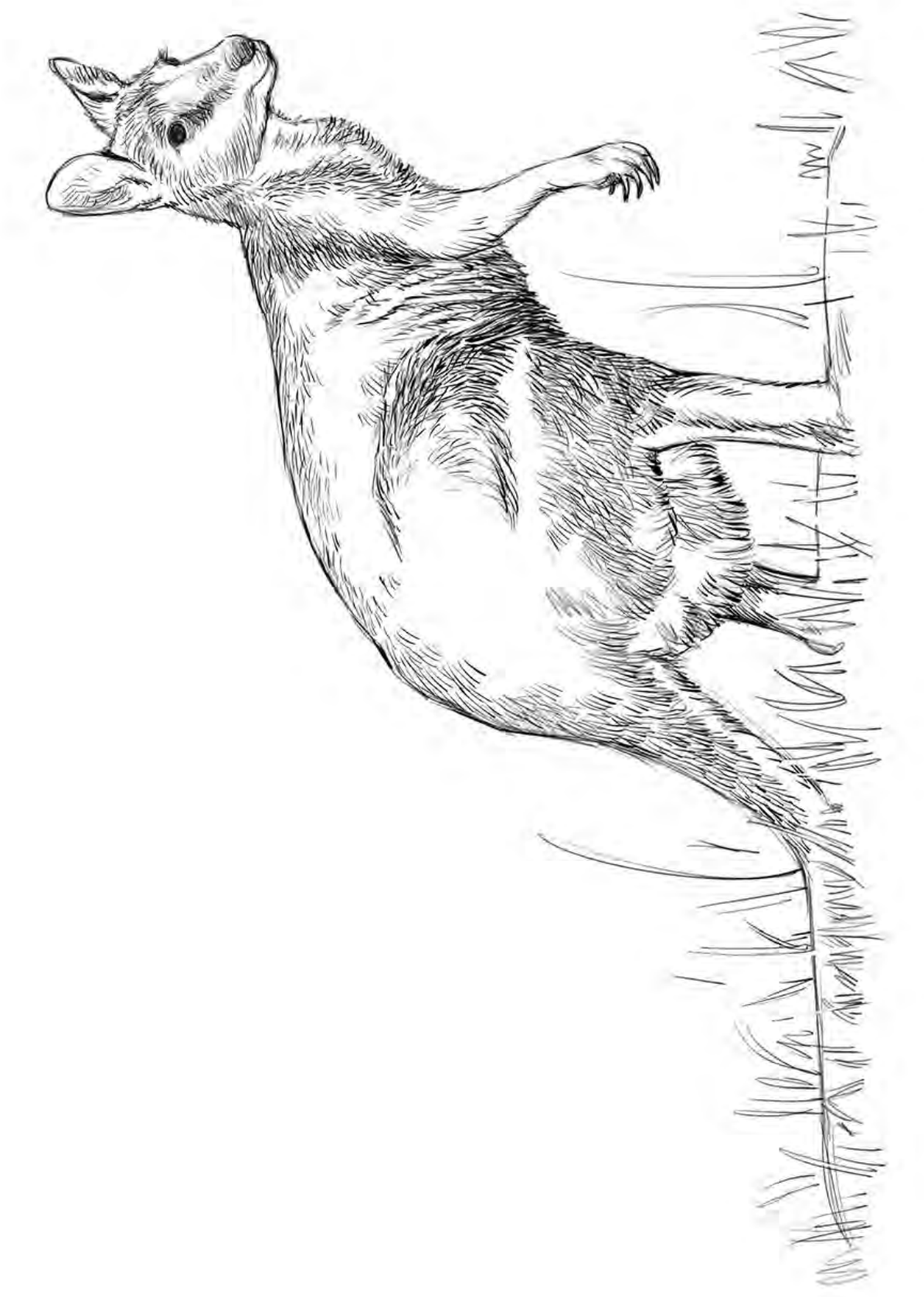
Teacher

Food Chain 1 – for teacher demonstration A5 images* of the sun, grass, wallaby, human food chain (+ arrows) with blue-tac/sticky tape for teacher to demonstrate on a whiteboard.

GRASS

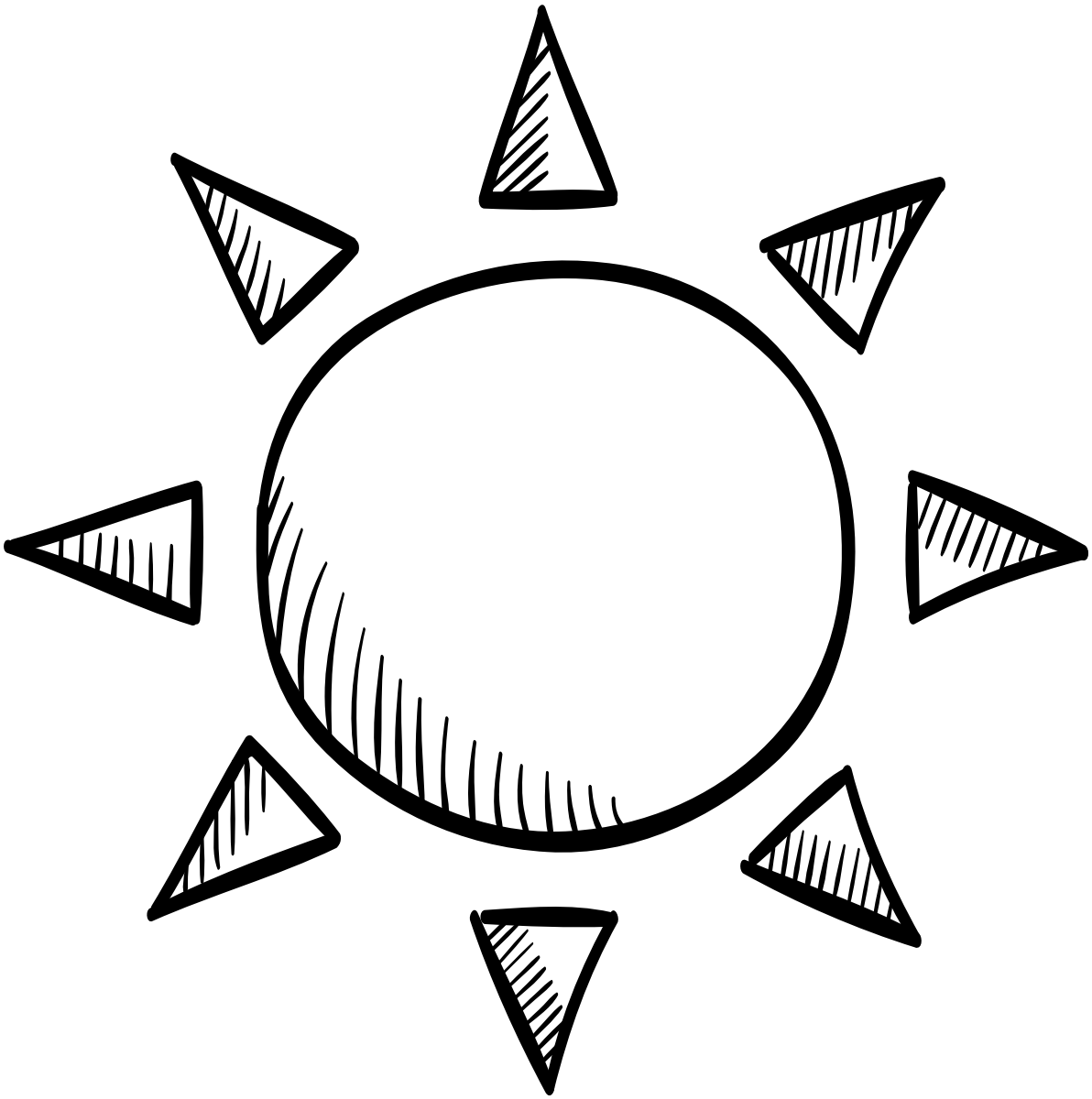


WALLABY

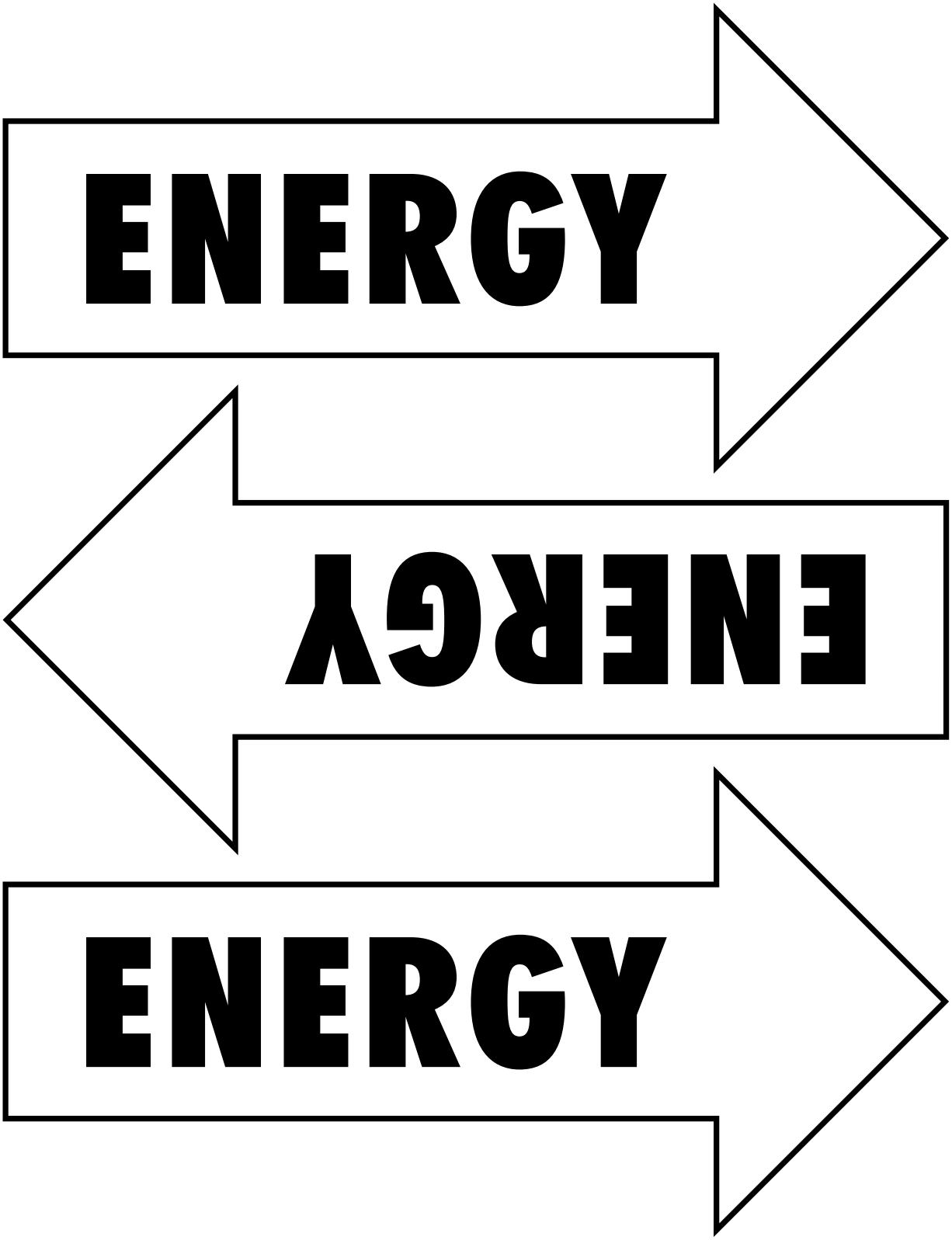


HUMAN

SUN



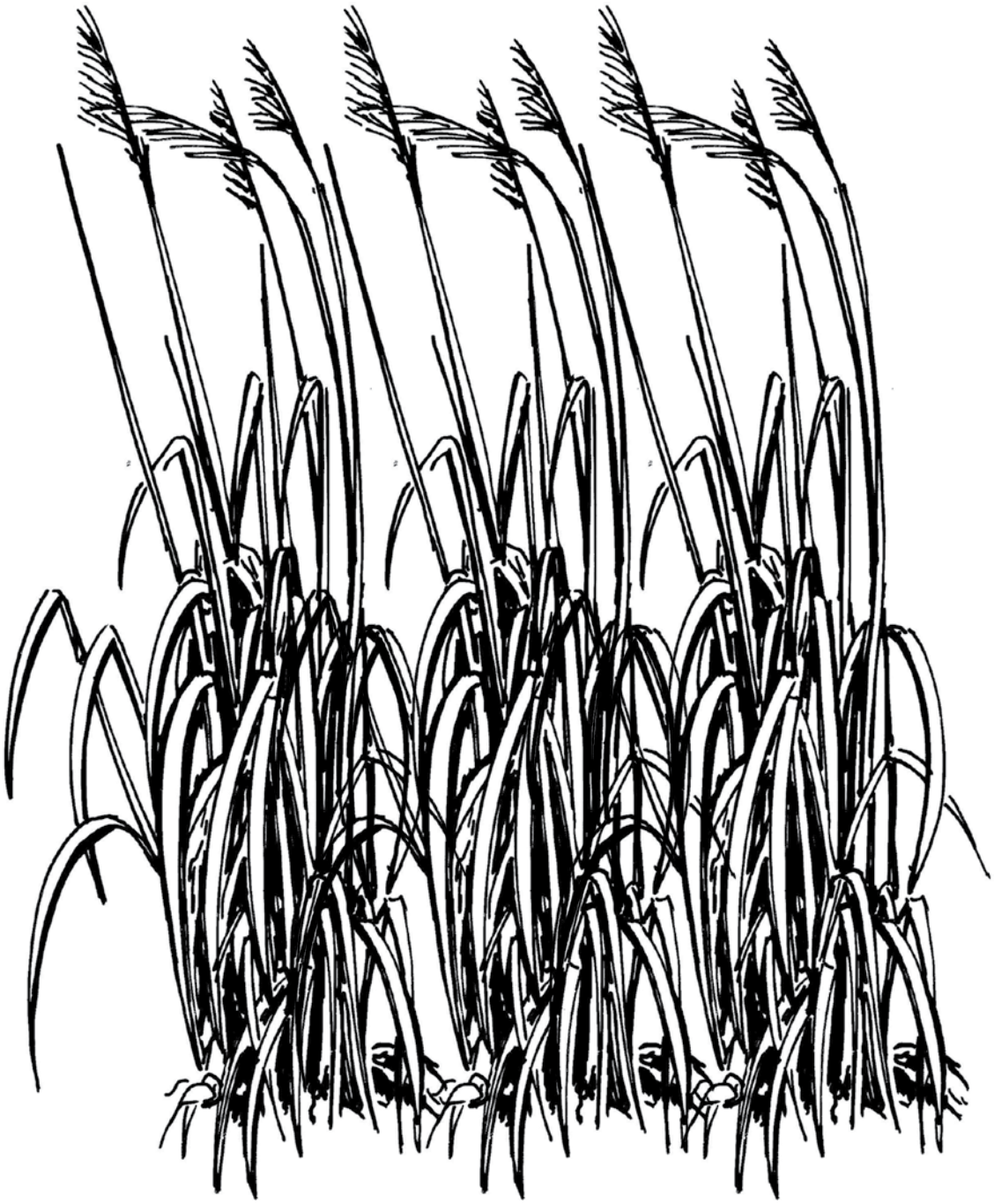
ARROWS



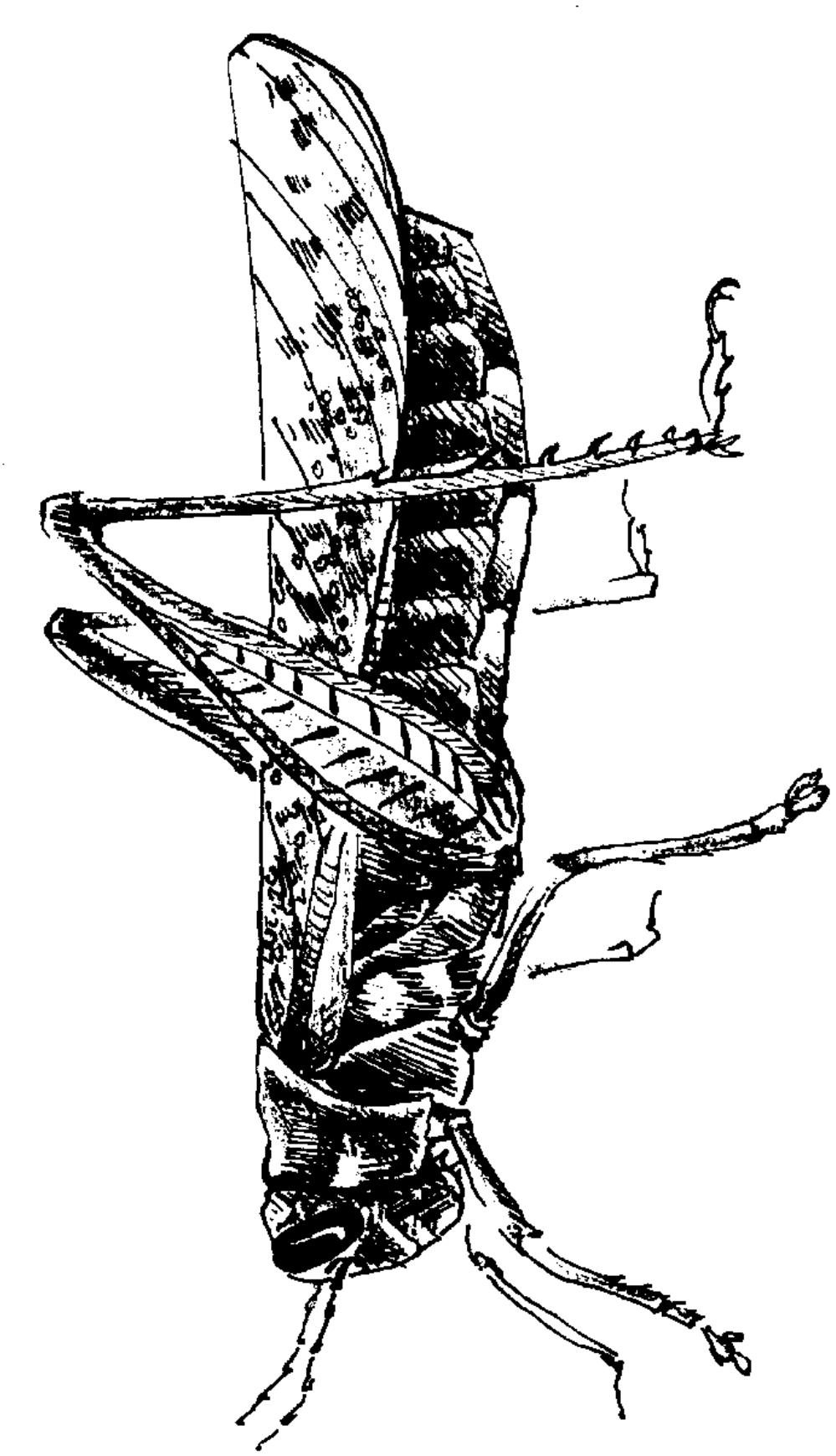
Teacher

Food Chain 2 – for students demonstration A5 images* of the sun, grass, grasshopper, frog food chain (+ arrows) with sticky tape for students to demonstrate on a whiteboard.

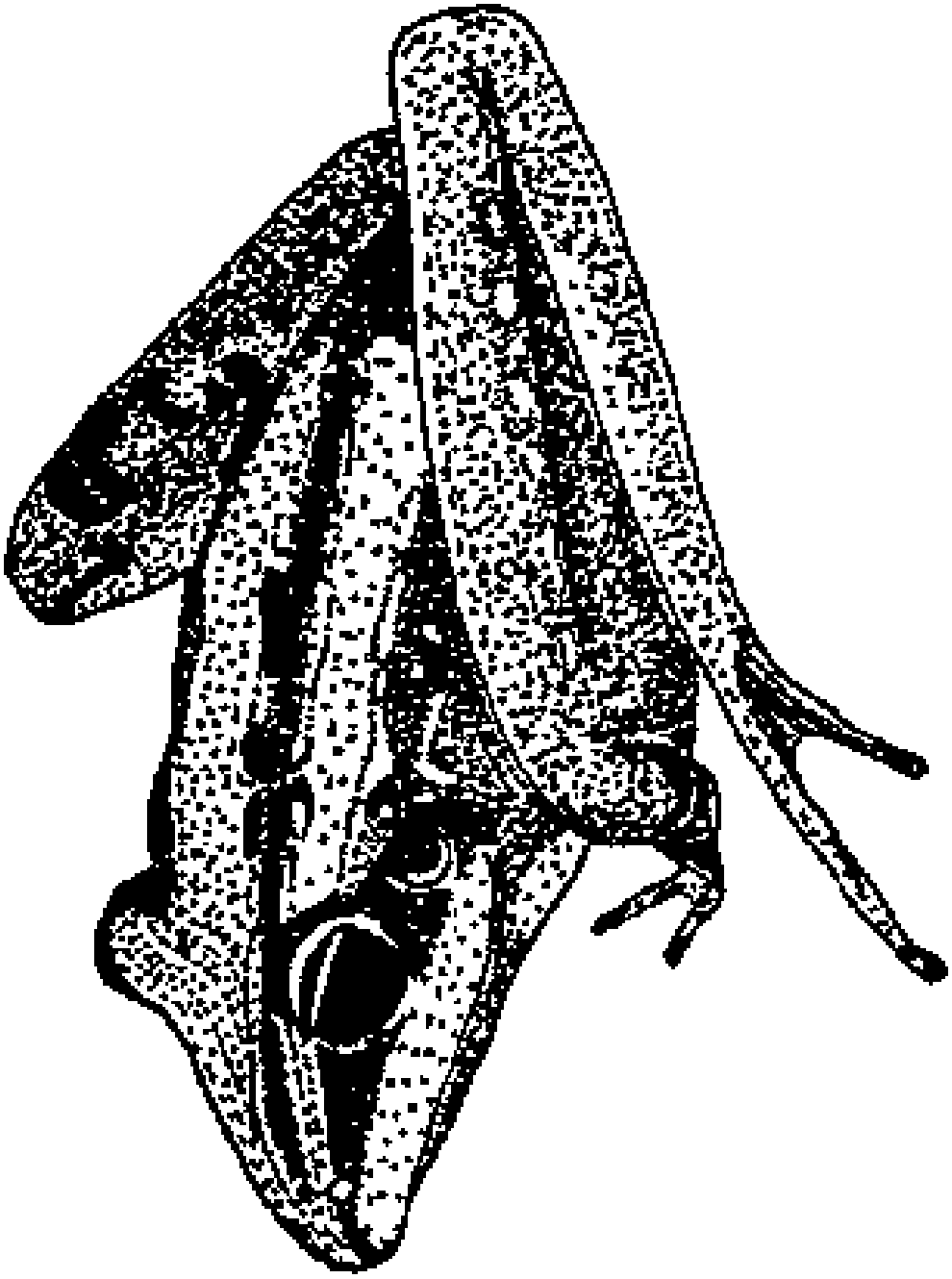
GRASS



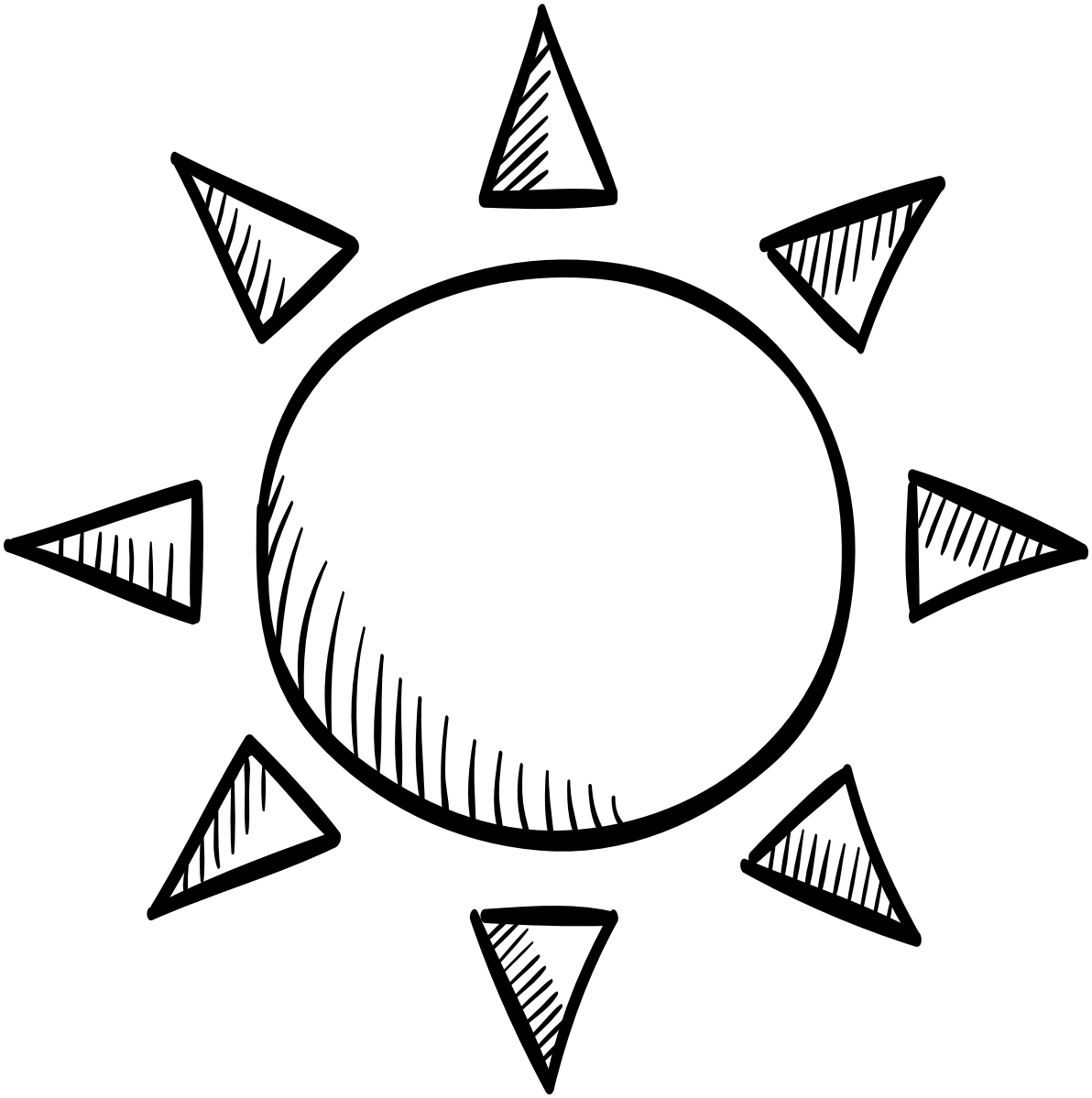
GRASSHOPPER



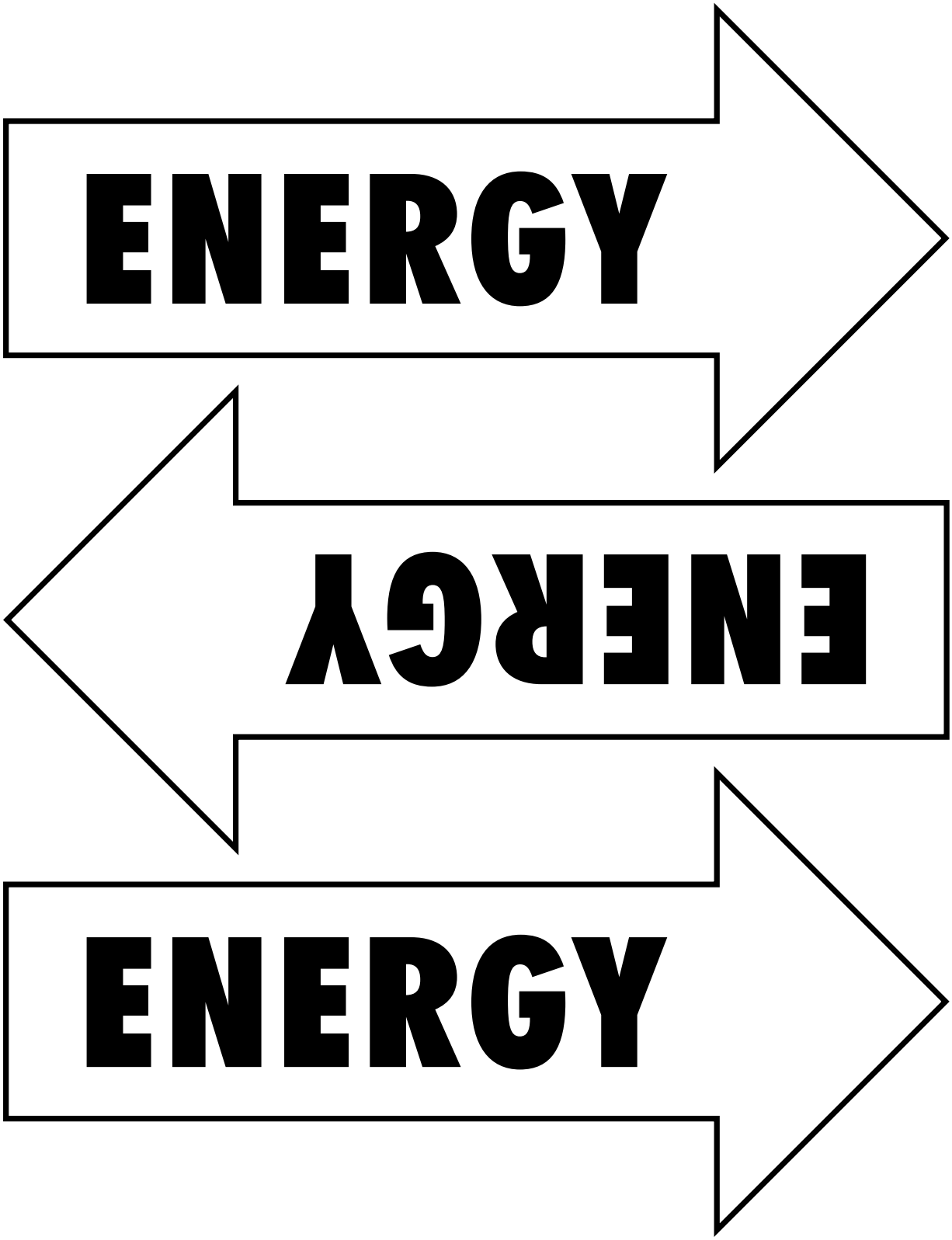
FROG



SUN



ARROWS



Student

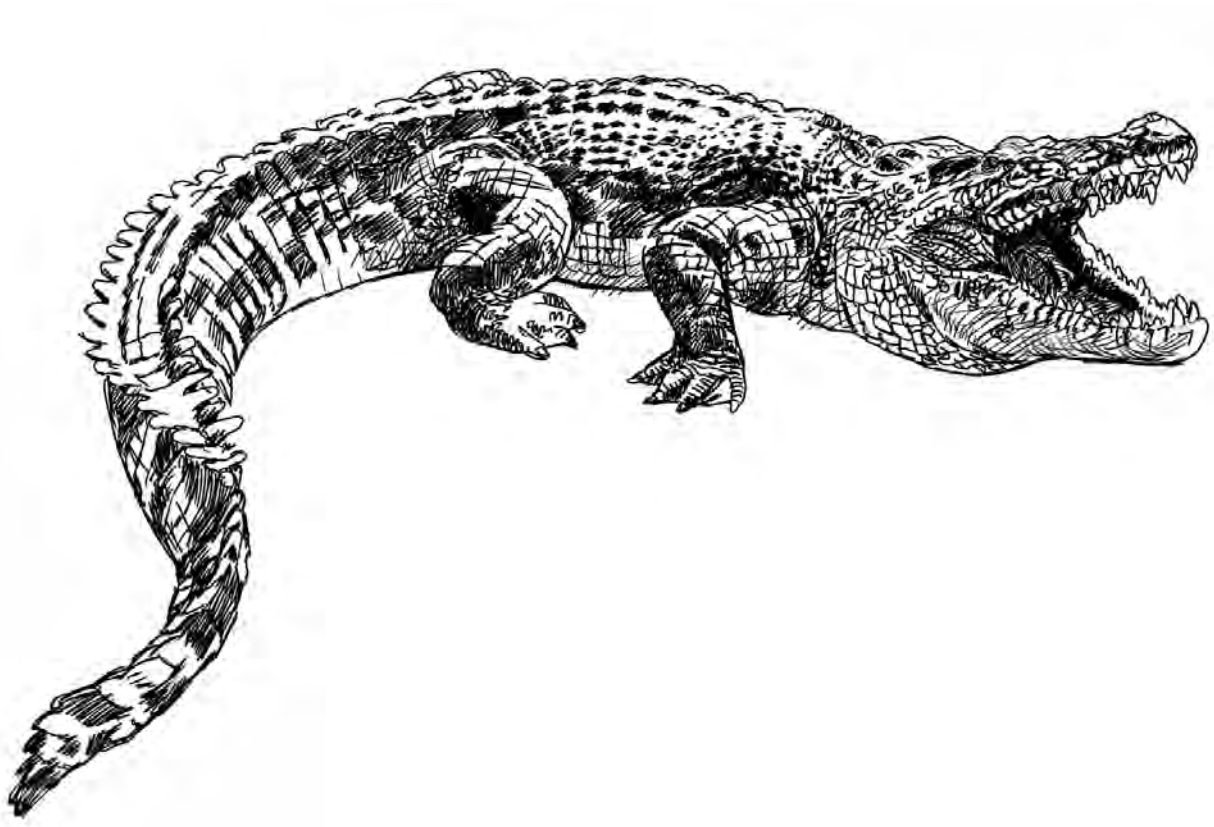
Food chain worksheet

Where does the energy flow?

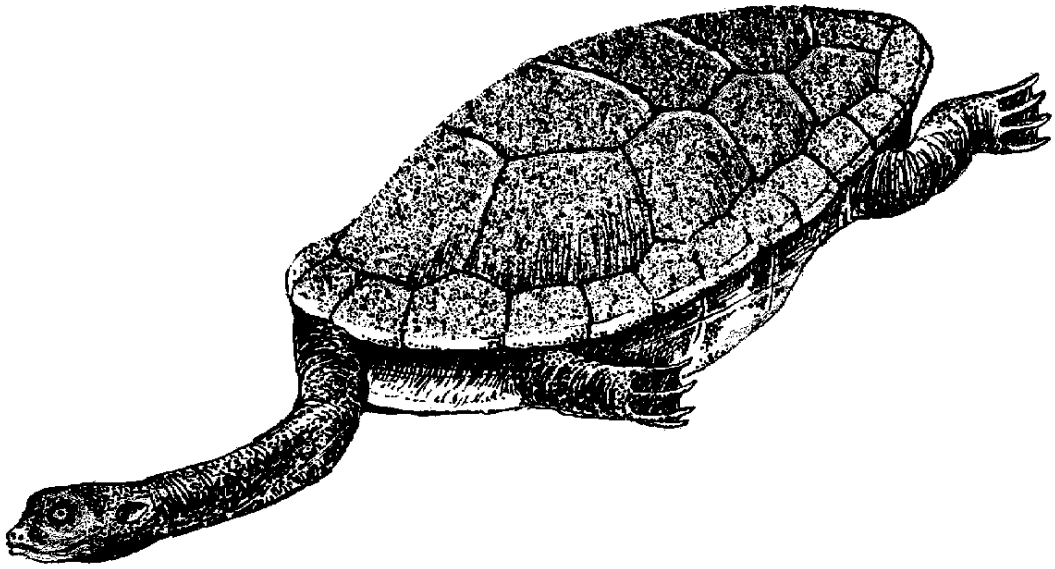
Create your **saltwater crocodile food chain** by following these steps.

1. Colour in the pictures.
2. Cut them out.
3. Put them in order to create a food chain. Use the arrows to show where the energy goes.
4. Check with an adult, and then glue them down.

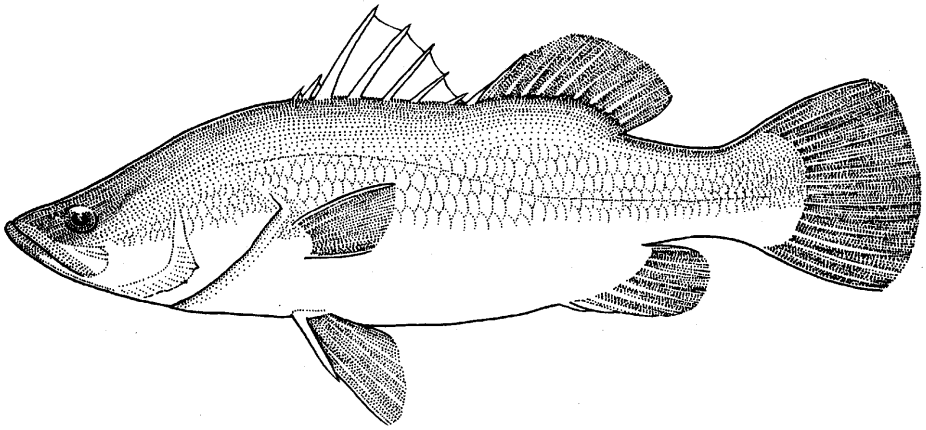
SALTWATER CROCODILE



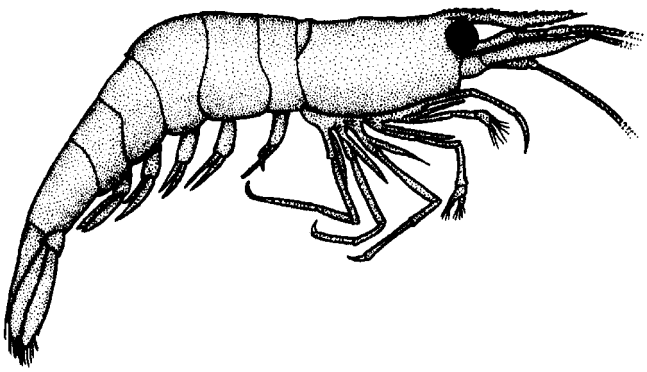
TURTLE



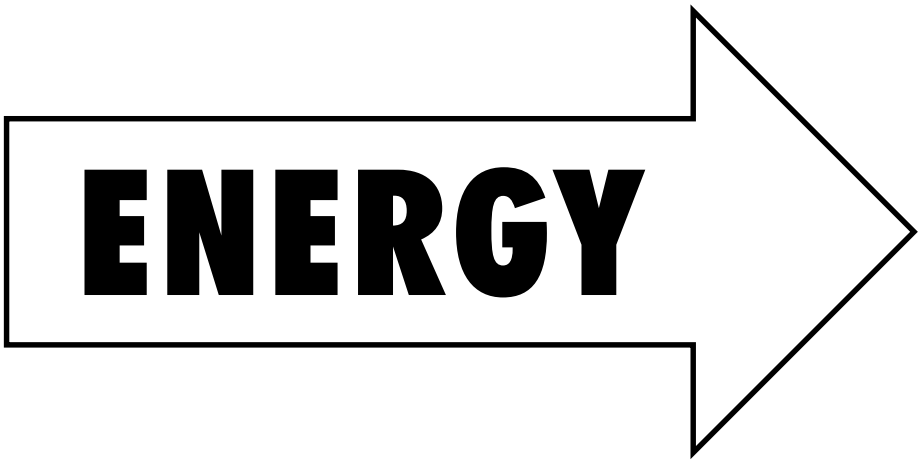
FISH

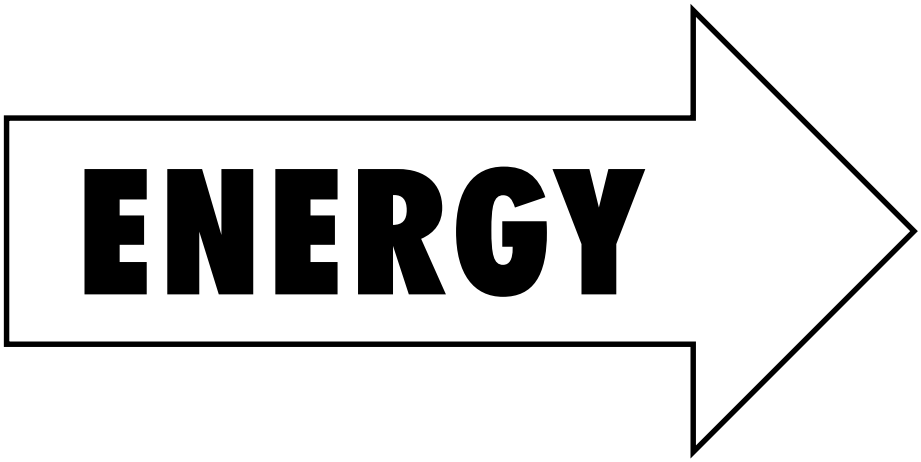


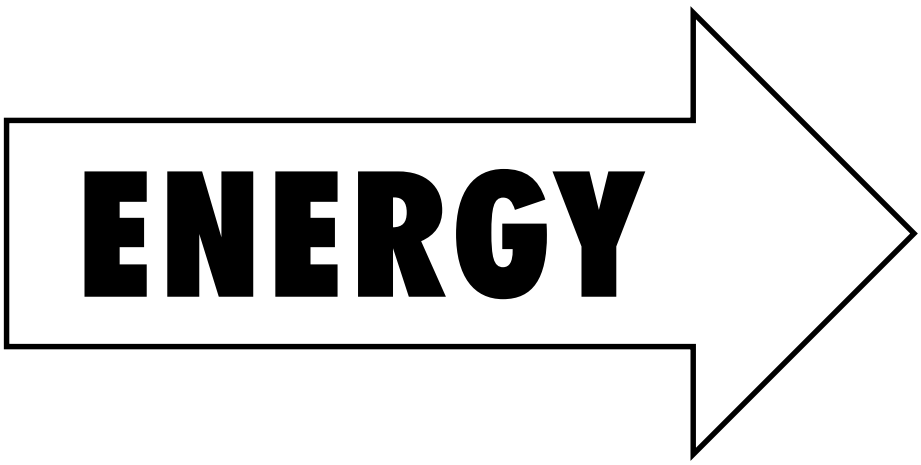
PRAWN



ARROWS







PRIMARY YEARS LESSONS

Suggested year levels

Year 4 to Year 6
(NB. activities can be modified up or down to suit other levels)

Teacher notes

The teacher notes (page 8-17 Be Crocwise Teaching and Learning Kit) give an overview of crocodile biology, adaptations, management in the NT and Aboriginal connections. These notes are the background knowledge a teacher needs to effectively use these lessons and activities.

Lessons

Be Crocwise messages

These lessons have been designed to reinforce the Be Crocwise messages about crocodile safety:

	Be Crocwise	Crocs are common	Crocs are deadly	Crocs move around	Only swim where signs say it's allowed
Lesson 4	✓		✓	✓	
Lesson 5	✓	✓	✓	✓	✓
Lesson 6	✓		✓		
Lesson 7	✓	✓	✓		
Lesson 8	✓	✓	✓	✓	✓

Ideas for units of work

The activities can be done as standalone activities or incorporated into other units of work. Some unit topic ideas are:

> we are a Crocwise classroom (see certificate, pg. XX/link)
> apex predators
> native animals
> seasonal cycles
> crocodile evolution.

LESSON 4 – TIMES OF THEIR LIVES

Teacher materials/preparation	Student materials
Internet access/projector for video links	
Access to YouTube and video clips	
Pre-made play-dough or plasticine crocodile 'egg' (8 x 5 cm football shape)	
Space or a wall/display board large enough to mark out crocodile sizes about 6.5 metres	
Tape measure (to reach up to 6.5 m)/metre-rule	
Chalk or masking tape to mark out different crocodile lengths	

Learning outcomes

Students:

- understand the lifecycle of a crocodile
- understand that during certain times of the year, crocodiles are more likely to be dangerous – **crocs are deadly**
- crocodiles move to new places – **crocs move around**
- can identify ways to **Be Crocwise**.

Success criteria

Students have:

- measured and compared the size of a newly hatched and a fully grown crocodile to themselves
- described when and why crocodiles become more dangerous and why they would move to a new place (i.e. reasons why **crocs are deadly** and **crocs move around**)
- discussed/described how they can stay safe in crocodile country (**Be Crocwise**).

Lesson introduction

Show the video clip from the BBC's *Spy in the Wild* series (link found at *Be Crocwise Resources*). It shows the relationship between a Nile crocodile and her hatchlings. Our saltwater crocodiles will behave in the same way (and they look very similar too).

Ask students: do you know that the saltwater crocodile is the largest reptile on our planet? Do you also know that at certain times of the year, saltwater crocodiles become more cranky and dangerous? Can anyone guess why?

Write students' ideas on the board. Tell the students they'll find out if they were right later. First, we are going to find out how big crocodiles really are.

Class activity/demonstration

Hand out a pre-prepared play-dough/plasticine crocodile egg to pass around the class.

Tell students: this is roughly the size and shape of a saltwater crocodile egg. Ask them to show, using their hands, how big they believe a crocodile is when it first comes out of an egg. This is when we call them ***hatchlings***.

> Measure out a 6.5-metre length of masking tape. At 28 cm, write 'hatchling'.

Tell students that they will now measure the size of the adult crocodiles.

NB: you could ask students to predict each of the following crocodile sizes

> The maximum length for a female Saltwater crocodile is between 3.1-3.4 metres (write 'female' on the tape at 3 metres).
> The maximum length for a male Saltwater crocodile is between 4.6-5.2 metres (write 'male' on the tape at 5 meters).
> 6.17 metres – this was the length of the largest-recorded male saltwater crocodile in captivity, named Lolong. Write 'largest male' at 6.17 meters.
> Something extra: add to your floor measurements the length of the average roof-top tinny (dingy) that people put into the waterways in the NT, which is 3.4 meters.

To help your students get an idea of scale, ask them to lie down alongside the line. How many students does it take to make the same length?

Class discussion

Ask students: do you remember how big a crocodile hatchling is when it first comes out of its egg? They are really small. Ask the class to lie down on their stomachs with chins on the ground to get an idea of how a hatchling sees the world. What does the world look like from down there?

Now think about the place the crocodile hatchling is in. Is the waterway a safe place for a hatchling? Animals like goannas and feral pigs will eat crocodile eggs and hatchlings. Luckily for the little hatchlings, a mother crocodile sticks around to look after her nest and her hatchlings.

Ask students to think back to the video clip they saw at the start of class. How was the mother crocodile behaving in the clip? Because the mothers are so protective, more of her hatchlings have a chance to survive and grow into adult crocodiles. It makes her very dangerous to anything she thinks might attack her babies. **Crocs are deadly**.

Show students a video of a female crocodile digging out her hatchlings – look how gentle she is with them! Link can be found at *Be Crocwise Resources*.

Tell students: mother crocodiles will look after their babies until they are a couple of months old. At this point, the babies start to wander off and will often become dinner for animals such as sea eagles or other crocodiles.

Male crocodiles don't like to share their patch of waterway with other crocodiles and will travel to find their own territory. Male crocodiles will also go looking for female crocodiles to start a family with. Sometimes male crocs will have to fight with other males to keep his space, or he has to move on and find new territory. So remember—**crocs move around**.

Show students this clip of one male crocodile scaring away another male. The crocodile lifts his head up to say he gives up.

Class discussion/role-play

Discuss with students: we now know how big crocodiles are and can understand some of the reasons why **crocs are deadly**. Being Crocwise means that when we're in crocodile country, we need to STOP before we act, have a THINK about what might be unsafe and DO the right thing to keep ourselves safe from crocodiles. I am going to tell you two stories where people need some help to Be Crocwise. I want you to listen carefully and think about what they could do differently. I will ask for your ideas after each story.

Story 1

One day, the Williams family went out on a fishing trip. The whole family were squeezed into a tiny boat. They don't know it, but the Williams family just went into a male crocodile's territory. Mum and dad are talking to each other about their fishing plans, big sister is singing her favourite song, and no one is paying any attention to what's around them. Little brother is bored, so he leans over the side of the boat and trails his hand in the water, making patterns.

It's time to STOP, THINK and DO.

Do you have an idea about things the Williams family should STOP doing? Ask students to list them. *Ideas should include: mum and dad should stop talking and stay alert for any signs of crocodiles, sister should stop singing and be aware of what her parents are doing and saying, brother must stop putting his hands outside the boat.*

Do you have an idea about things the Williams family should THINK about? Ask students to list them. *Ideas should include: we are in crocodile country, so there may be crocodiles in this water, crocodiles can grow very big – even bigger than the boat, and crocodiles will protect their patch of water. Crocodiles will see you before you see them. You will not see all the crocodiles that are around you.*

Do you have an idea about things the Williams family should DO to Be Crocwise? *Ideas should include: keep their body in the boat, stay alert for signs of crocodiles such as slide marks, and get themselves a bigger boat.*

Story 2

The Williams family are having a fun day out exploring the river bank. They are jumping off logs and climbing trees. Walking through the spear grass, they come across a cleared area with a big mound in the middle. The mound is made of sticks, leaves and mud. Dad decides to dig into the mound. This is not a good idea.

It's time to STOP, THINK and DO.

What do you think dad is digging into? *ANSWER: saltwater crocodile nest.*

Do you have an idea about things the Williams family should STOP doing? Ask students to list them. *Ideas should include: stop going near the river's edge, don't walk through long grass, stop digging in possible saltwater crocodile nests.*

Do you have an idea about things the Williams family should THINK about? Ask students to list them. *Ideas should include: be aware of their surroundings (someone or something would have cleared the area), saltwater crocodiles can leap out of the water (stay away from the river's edge and spear grass can stop you seeing what's in front of you), know when saltwater crocodiles nest and are likely to be more protective.*

Do you have an idea about things the Williams family should DO to Be Crocwise? *Ideas should include: walk further away from the edge of the river, make sure they can see where they're walking, keep well away from crocodile nests.*

Reflection

Students can answer one of these questions before they leave:

- What are 5 things that surprised you in today's lesson?
- What are 4 things people should do to stay safe from crocodiles?
- What are 3 different crocodile sizes that we measured today? *(e.g. hatchling = 28 cm, female = 3 m, male = 5 m)*
- What are 2 reasons that **crocs are deadly**?
- What is 1 reason that **crocs move around**?

Going further:

- Create a life-sized model saltwater crocodile measured in student bodies as well as metre values.
- Record the students' role-plays to show an audience to share the Be Crocwise safety messages.
- Compare crocodile nests and eggs to those of other egg-laying animals (e.g. chicken, turtles, penguin, snake, echidna).
- Create a habitat diorama for a saltwater crocodile showing what it needs to survive (e.g. mud, water, trees, food source). Materials students could use: coloured paper, cellophane, sand, shredded paper, bark, leaves, plasticine, egg cartons. Students could also create a model crocodile in their habitat.

LESSON 5 – TRAPPING FOR SAFETY

Teacher materials/preparation	Student materials
Labels: 'True' and 'False' A4 pages, printed and displayed on opposite sides of the room/space (blue-tac/sticky tape to attach)	Print: 'Find the traps!' worksheet for each student
Print: 'True and false saltwater crocodile statements' to read out to the class	Pens/pencils
Graph: 'Number of crocs caught in 2015, electronically displayed or enlarged print to show class	Access to computers and internet for Google Maps OR Individual copies of a street directory (pages corresponding to the map could be photocopied prior)
Print and cut out: 'Crocodiles management information' cards. Each student should receive at least one section of information	
Internet access and video links	
Book computer lab for Google Maps/internet access OR photocopy 'Find the traps!' worksheet.	

Learning outcomes

Students:

- that **crocs are common**
- that **crocs move around**
- that **crocs are deadly** and how they are managed for people's safety
- how to recognise, read and **identify Crocodile management / safety signs**
- how to **Be Crocwise**.

Success criteria

Students have:

- discussed that **crocs are common** and why people are interacting with them more
- discussed why **crocs move around**
- described when crocodiles are more likely to move around
- worked together to recognise the different types crocodile management strategies
- used grid referencing to mark out the location of crocodile traps in the Darwin region.

Lesson introduction

Show students the Be Crocwise video, link found at *Be Crocwise Resources*.

Tell the students: remind students that they live in crocodile country and that many crocodiles live in crocodile country (**crocs are common**). Today, with more people living in the same area, it's getting harder to keep people and crocodiles away from each other. To help keep people out of danger from crocodiles, we need to know some important things about the saltwater crocodile. One of these things is that crocs move around! Every year, **crocodiles move around** to find new territories.

In today's lesson, we are going to learn why **crocs move around** and which times of the year they do it. We'll look at how crocodiles are controlled in different places around the Northern Territory and map out some places you could see a crocodile trap.

First, let's find out what you already know about saltwater crocodiles! I'm going to read out some true or false statements. If you think the statement is true, move to the wall with the true label. If you think it's false, head to the other side of the room. Ready?

One at a time, read out the 'true and false saltwater crocodile statements'. For any false statement, be sure to explain why the statement is false.

Please note: this is intended as a short activity to get students moving and engaging in the topic. Monitor the students' interest and finish the activity when appropriate, not necessarily when you've read all the statements.

Class discussion

Discuss with the class: were you surprised at some of those true/false statements? These statements were to help you understand that **crocs move around**. How do we know this? When saltwater crocodiles are caught in traps and taken away from a place, new crocodiles move in.

Have a look at the saltwater crocodile information on this graph. Show students the graph 'Number of saltwater crocodiles caught in 2015'

> What do you think the graph is measuring? *ANSWER: the number of saltwater crocodiles caught in 2015.*

> In July, there were only 5 crocodiles caught. Why do you think more were caught in the following months – especially in October? Why do you think that is?
  - What happens at this time of the year? *ANSWERS: the wet season rain has started; waters come up and crocodiles are able to swim around (they prefer to do this rather than walk over land).*
  - Why do you think a crocodile would need or want to move around? *ANSWERS: crocodiles are pushed out of their territories by bigger crocodiles or when they need to find new territories with more food. Male crocodiles need to move to find female crocodiles for the mating season.*

> At what time of the year were the most crocodiles caught? A*NSWER: April. This is after wet season when the water settles and 1) the crocodiles settle into their territories and 2) the water is calm enough for more traps to be put back in the water.*

Tell the students: people want to go swimming, fishing, canoeing or camping in or near Northern Territory waterways, but now we know when **crocs move around** and why. With crocodiles moving into new territories, it's easy to see why it's harder for everyone to stay safe from crocodiles. Did you know Parks and Wildlife has a croc team and other rangers working to keep people safe? They're the people to call if a *problem crocodile* needs to be removed (a problem crocodile is one that's acting aggressively or cranky or has attacked boats, pets or people).

Show students the ABC article '*How to catch a crocodile: On patrol with the world's busiest croc-catching team in Darwin*'. You can also find video footage on YouTube of **Crocodile Management Team rebaiting crocodile trap** and one showing the **removal and relocation of a small saltwater crocodile from a crocodile trap**. Links can be found at *Be Crocwise Resources*.

Class activity

Tell the students: the croc team and other rangers use three main management strategies for saltwater crocodiles. Split the class into three teams. Give each group some information about a type of management strategy and ask them to report back to the larger class.

Please note, there are 5 information cards for each type of management strategy. If you have more students, the sign examples in types 2 and 3 could be split between two students, or the larger information cards could be shared between pairs.

Hand out the cards from the information sheet. Give the students enough time to process the information on their card and to have a practise run of presenting this information as a group. Ask each group to stand up and share their information to the rest of the class.

Discuss with the class: we now know that the croc team and other rangers trap crocodiles to make some places safe for swimming or to remove a problem crocodile. Some of these traps are permanently in place in places where crocodiles are continually removed, like in Darwin Harbour.

Tell the students: the croc team appreciates it when people call to tell them a crocodile in one of their traps. But they don't like hearing about people climbing on them! Traps are baited with meat, and the smell of the meat attracts crocodiles into the trap. Believe it or not, some people are silly enough to climb onto a crocodile trap! This is extremely dangerous.

To report problem crocodiles or someone interfering with a croc trap, phone the croc team:

> Darwin: 0419 822 859 or (08) 8983 2475
> Katherine: 0407 958 405 or (08) 8973 8888.

Tell the students: the next part of the lesson is to have a look where some of the permanent traps are and to find their locations using map coordinates. Hand the 'Find the traps!' worksheet to each student. Ask them to follow the steps.

Students who finish early can form small groups and check their answers or help others complete the task.

Collect worksheets or discuss the results as a class.

Reflection questions

- Today you've used a grid and coordinates to find traps set around the Top End. Can you name some of these places?
- You've also discussed the different ways the Parks and Wildlife croc team and other rangers manage saltwater crocodiles. Can you remember the three ways? *Answer: exclusion, no tolerance, problem crocodiles removed.*
- Why do people always need to be on the lookout in crocodile country? *Answer:* ***crocs are common, crocs move around, crocs are deadly***
- Why could a waterway be unsafe for swimming, even if no one has seen a crocodile there before? *Answer:* ***crocs move around****.*
- For what reasons do crocodiles move around? *Answer: to find food, a mate or territory.*
- What time of the year is a crocodile most likely to be on the move? *Answer: wet season – higher water levels.*
- What is it that the croc team hates to hear people doing with their traps? Why? *Answer: people climbing on traps – because it's extremely dangerous being in water with rotting meat intended to attract crocodiles!*

Going further

- Have students brainstorm the reasons why someone would want to climb on a crocodile trap. What could they do to teach people not to do this? Create a message/slogan and choose an appropriate medium (PowerPoint, poster, TV commercial) to share this with others.
- Visit a crocodile farm, and find out the history of where crocodiles came from.
- Invite a ranger to come and talk about trapping crocodiles.
- Research different styles of crocodile traps. Students can create a model or draw a picture of a chosen trap. Ask students to design an improved or different crocodile trap. Look at other trap designs to help (e.g. Elliott traps, mouse traps, possum traps). Discuss the goals in trapping a protected species and the ethics involved with this.

LESSON 5 RESOURCES

Teacher

> true and false labels
> true and false saltwater crocodile statements
> number of saltwater crocodiles caught in 2015
> managing saltwater crocodiles – information cards.

Student

> 'Find the traps!' worksheet.

True and false labels

TRUE = FACT ✓

FALSE = FICTION ✗

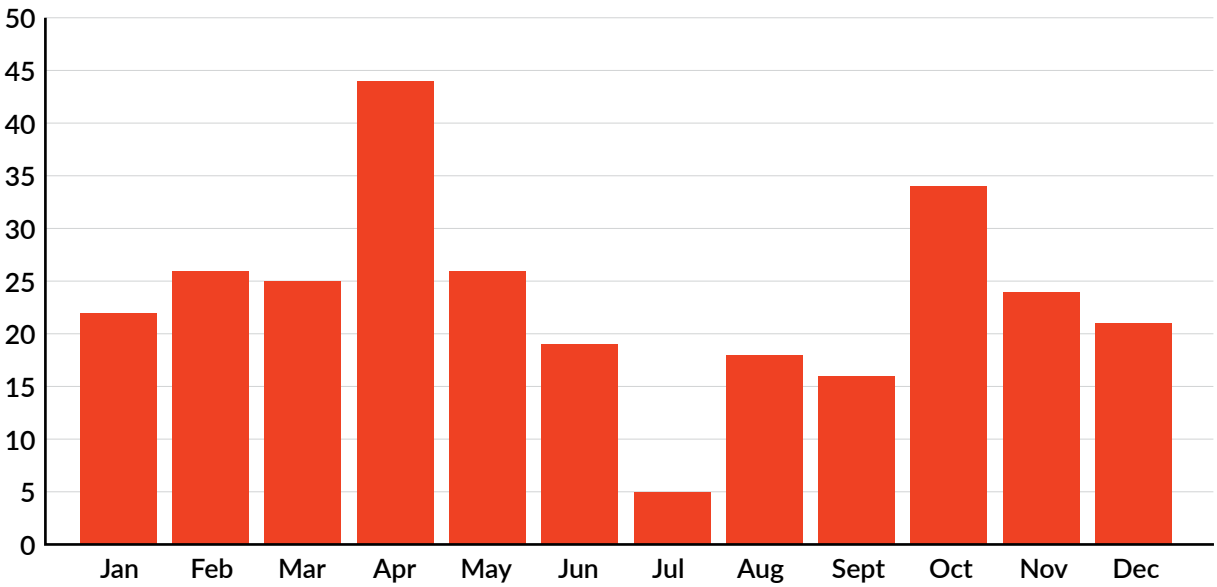
Saltwater crocodile statements

NB: this is intended as a short activity. You don't have to go through all these statements—judge your students' interest as you go and modify the time you spend on it to suit.

TRUE, FACT	FALSE, FICTION
Saltwater crocodiles can live for more than 70 years	Saltwater crocodiles are only found in Australia *Also found in South-East Asia*
Saltwater crocodiles can grow to over 6 metres *The largest recorded was 6.14 m, but some people think there are some over 8 m out there*	Saltwater crocodiles can only live in salt water *They have a special gland on their tongue that removes excess salt, which allows them to live in salt water as well as fresh water*
Saltwater crocodiles build mounds for their eggs	In a crocodile nest, half of the hatchlings are female and half are male *Gender is determined by the average temperature of the nest. 32°C = only males, above or below that (31°C or 33°C) = all females*
A male Saltwater crocodiles can travel hundreds of kilometres to find a mate	A female Saltwater crocodiles leaves her nest as soon as she lays her eggs *Female crocodiles are protective parents, actively defending their nests and hatchlings*
Saltwater crocodiles were almost hunted to extinction. *Only around 3000 were left across Australia. Since crocodiles were protected in the NT in 1971, numbers have returned to pre-hunting levels.*	Saltwater crocodiles teeth are designed for cutting *No, they are only good for holding. If they can't swallow their prey whole, they must break pieces off by thrashing or using a 'death roll'*
It's easy to hold a crocodile's jaws closed *The muscles to close the jaws are very strong, but the muscles to open them are quite weak, which is why they can be taped/cable-tied closed*	Saltwater crocodiles can run very fast on land for a long time *They can have short bursts of speed on land but rarely faster than 10 km/hr and will tire quickly*
Saltwater crocodiles move around to find new territory/places to live. Smaller crocs can be pushed out of a territory by larger ones	It's OK to stand in the water when you are fishing as long as you visit a different place each time *A Saltwater crocodiles will wait and watch to see a pattern, they are also opportunistic.*

TRUE, FACT	FALSE, FICTION
A crocodile will see you before you see them *They have excellent vision, hearing and sensors along their jaw and belly that pick up vibrations*	Saltwater crocodiles only attack tourists or visitors, not locals *In fact, more locals have been attacked*
Saltwater crocodiles do not run out of teeth *When one of the 66 teeth is broken, a replacement tooth pushes up from underneath*	Saltwater crocodiles can only stay underwater for 15 minutes at a time before having to come up to breathe *Some larger crocodiles can stay underwater for more than an hour!*
Saltwater crocodiles can be found in rivers, creeks and along the coast in the Top End of Australia	It's safe to stand on the water's edge, as long as you're not touching the water *A crocodile's tail is so strong it can propel two thirds of its body out of the water. You should stand 5 metres back.*

Number of saltwater crocodiles caught in 2015



Managing saltwater crocodiles – information cards

NB: for each management type, there are five management information cards

Management type 1: Exclusion

Management type 1: exclusion
Management goal:
To prevent all saltwater crocodiles from entering an area such that the level of risk is low enough to recommend swimming (e.g. Wangi Falls, Litchfield National Park).

Management type 1: exclusion
Are water-based activities safe?
Safe for swimming and other water-based activities.

Management type 1: exclusion
Are crocodiles present?
Extremely unlikely when open for swimming.

Management type 1: exclusion
What can the signs say?
May be closed sometimes, such as during the wet season or if a crocodile has been seen.
There are 'very low crocodile risk' or 'swimming closed' signs.


⚠ CROCODILE SAFETY
VERY LOW CROCODILE RISK
Wangi Falls Plunge Pool
Rock Face
Falls
Falls
Wangi Plunge Pool
Steps
Platform
You are here
Crocodile Management Zone
Management practices reduce the risk of Saltwater Crocodiles entering this area.
• Surveys conducted prior to opening area.
• Trap(s) set outside the swimming area.
• Saltwater Crocodiles removed when detected.
• Report any sightings to Parks and Wildlife, phone 0419 822 859 or use the Emergency Call Device in the carpark.
OPEN FOR SWIMMING
BE CROCWISE
NORTHERN TERRITORY


⚠ Swimming Closed
DANGER - DON'T ENTER WATER
Wangi Falls
Crocodiles and dangerous currents may occur at this time and can cause injury or death.
• Keep away from the water's edge.
• No swimming.
BE CROCWISE
NORTHERN TERRITORY

Management type 2: no tolerance

Management type 2: no tolerance
Management goal:
To significantly reduce the risk of attack by removing any crocodiles that enter the area (e.g. Darwin Harbour and outer Darwin residential areas).

Management type 2: no tolerance
Are water-based activities safe?
Not safe for swimming except in patrolled areas. Other water-based activities are allowed with care.

Management type 2: no tolerance
Are crocodiles present?
Low chance but possible.

Management type 2: no tolerance
What can the signs say?
'Crocodile safety' signs. Please note, not all areas will have signage. If there's no safe swimming sign then crocodiles may be present.


Crocodile Safety
WARNING
Only swim in designated areas.
BE CROCWISE
NORTHERN TERRITORY


Crocodile Safety
DANGER
Crocodiles inhabit this area.
Attacks cause injury or death.
• Keep away from the water's edge.
• Do not enter the water.
• Take extreme care when launching and retrieving boats.
• Do not clean fish near the water's edge.
• Remove all fish and food waste.
• Camp well away from the water.
BE CROCWISE
NORTHERN TERRITORY

Management type 3: problem crocodiles removed

Management type 3: problem crocodiles removed
Management goal:
Only problem crocodiles are removed (*problem crocodile = any crocodile that is acting aggressively/cranky or has attacked pets or people*) (e.g. Fogg Dam Conservation Area).

Management type 3: problem crocodiles removed
Are water-based activities safe?
Not safe for swimming. Other water-based activities are allowed with extreme caution.

Management type 3: problem crocodiles removed
Are crocodiles present?
Depends on the location but assume there is a high chance.

Management type 3: problem crocodiles removed
What can the signs say?
'Crocodile safety' signs. Please note, only designated swimming areas will have signs. If there is no designated swimming area sign then crocodiles may be present.

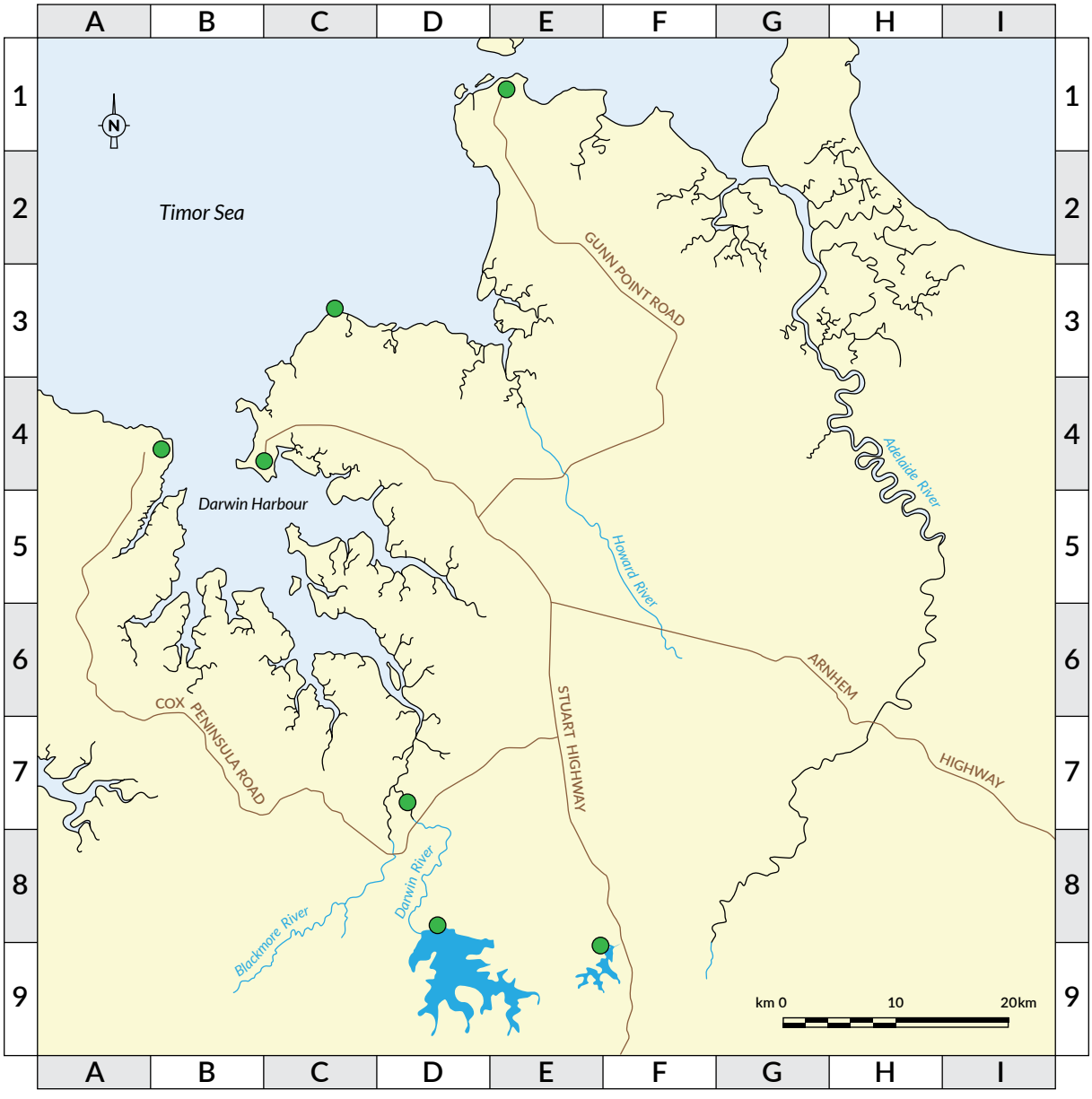

Parks and Wildlife
Commission
NORTHERN
TERRITORY
GOVERNMENT

Work Sheet 'Find the traps!'

Crocodile traps in the Darwin region

Instructions

1. Using Google Maps or a street directory, label the seven landmarks/towns marked with a "★"
2. Match the coordinates of permanent crocodile traps below with the symbol "▦" on the map. Label the symbols.

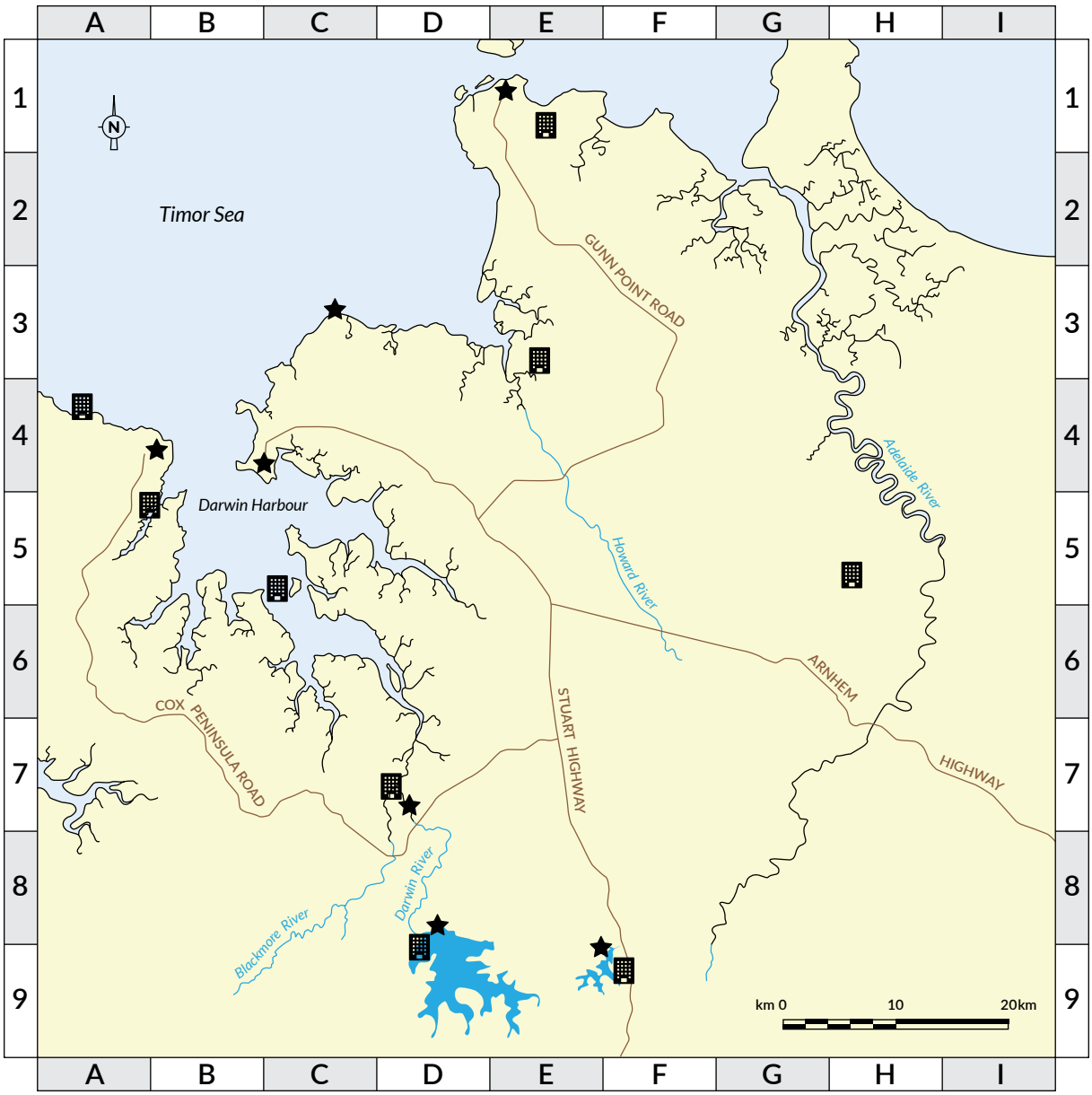


A4	Wagait	E1	Leaders Creek
B5	Woods Inlet	E3	Howard River
C6	Pioneer Creek	F9	Manton Dam
D7	Southport	H5	Fogg Dam
D8	Darwin River Dam		

3. If you have time and access to a computer, head online to view a map of crocodile captures and see the number of crocodiles captured in the last few years. A link to this map can be found at *Be Crocwise Resources*.

If you ever see one of these traps and it is closed, please call the croc team on 0419 822 859 to let them know!

ANSWERS "Find the traps!"



LESSON 6 – CRANKY CROCS = GOOD PARENTS

Teacher materials/preparation	Student materials
Access to projector and internet to display image and video	Individual copies of the 'Saltwater crocodile breeding cycle' worksheet (circular calendar)
Printed copies of the 'Saltwater crocodile behaviour scenario cards' (NB: there are 3 scenarios, so you may need multiple copies depending on your class size and how many students you prefer in a group. For example, for a class of 24, you may choose to have two groups of four students performing each scenario)	Pen/pencil
A way of projecting the 'Croc breeding cycle' circular calendar worksheet for students to see and copy/work through (e.g. electronic whiteboard, projector)	Four different pencils, markers or highlighter colours for each student. Choose colours light enough that you can write over them and still see the writing
Stopwatch/timer	

Learning outcomes

Students:

> understand that saltwater **crocs are deadly**

> know that saltwater crocodiles are more aggressive at different times of the year and can explain the reasons for this

> understand dangerous behaviours in crocodile country and suggest safer alternatives for people to **Be Crocwise** and reduce their risk of crocodile attack.

Success criteria

Students have:

> discussed some adaptations/features that make saltwater crocodiles such successful predators (**crocs are deadly**)

> listed the times of the year saltwater crocodiles are particularly aggressive

> explained/demonstrated through role-play why crocodiles are more aggressive at these times

> identified alternative, safer behaviours for people living in crocodile country to **Be Crocwise**.

Lesson Introduction/brainstorm

Present an image/video of a saltwater crocodile. Links can be found at *Be Crocwise Resources*.

Tell the students: we have two different types of crocodiles in Australia. Which one is this? *ANSWER: saltwater.* The saltwater crocodile will eat anything it can catch. It is a very effective predator (*check students' understanding of the meaning of predator*). **Crocs are deadly.**

Ask the students: have another look at this picture of a saltwater crocodile. What features/adaptations of the crocodile make them such good hunters? (*Check students' understanding of the meaning of features/adaptations*). Write the students' ideas on the board. *VARIOUS ANSWERS: teeth, strong closing jaws, strong tail, very good eyesight and hearing. Also see the table in Teacher's Notes, Adaptations (page 15) for more.*

Did you know that these adaptations/features make them good at defending and protecting too?

Check students' understanding of these words.

What could a crocodile be defending or protecting?

Males – females/mates/girlfriends, territory (food and shelter for him and his girlfriends)

> show video of males defending their territory, link available at *Be Crocwise Resources*.

Females – nests and eggs, hatchlings

> show videos of mother digging out her nest (so gentle!) and watching over her hatchlings as they eat mudskippers, links available at *Be Crocwise Resources*.

Tell the students: in this lesson, you are going to think about life from the crocodile's point of view and imagine you are a crocodile. You'll also learn about the times of the year crocodiles are more likely to be defending and protecting their territory, nest or young. Once we know this, we can work out when crocodiles are more likely to be cranky and what we can do to **Be Crocwise** at these times.

Class activity/role-play

Break the class into small groups. Each will role-play one of three scenarios (depending on the class numbers, there could be more than one group presenting each scenario). Give the groups 10–15 minutes to prepare their role-play to present to the class. Hand out the 'Saltwater crocodile behaviour scenario' cards.

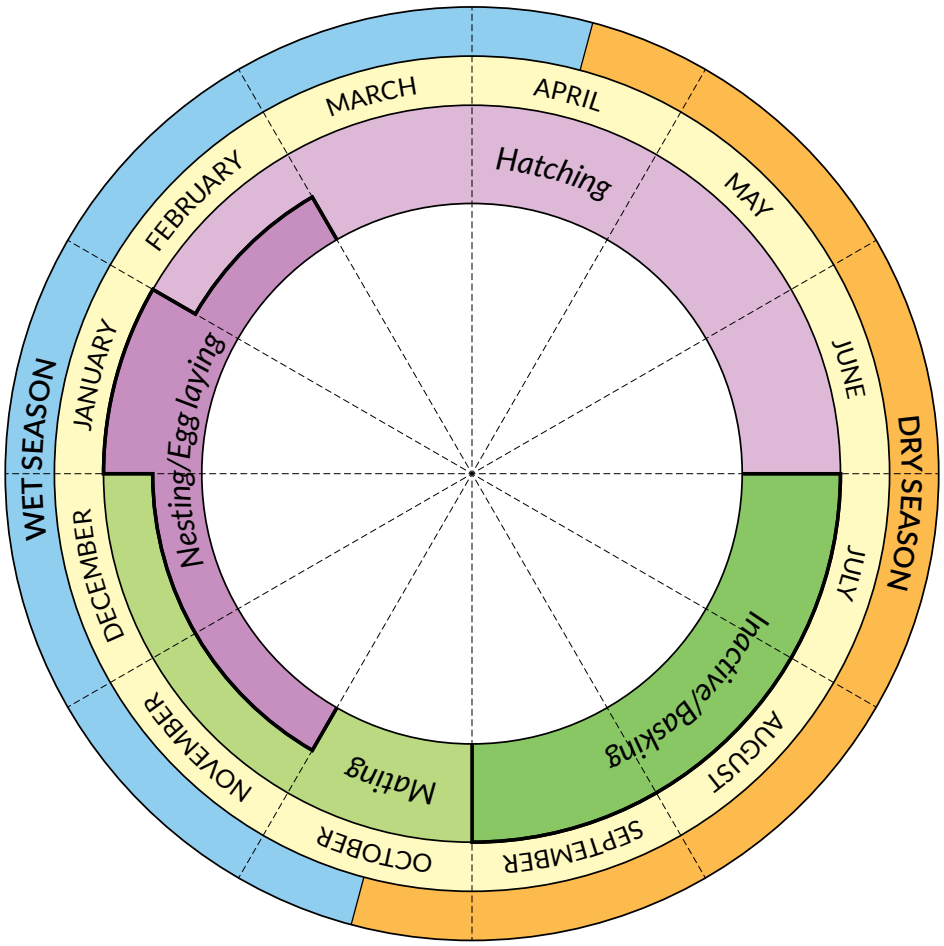
After students have prepared their presentation and while still in their groups, hand out the 'Croc breeding cycle' worksheets to each student. Students will need something to write with, 4 different light-coloured pencils/markers/highlighters and a hard surface to write on. Next, project a version of the worksheet so that the whole class can see it. As a class, complete the worksheet like this:

Fill in the months of the year, in order, on the second 'months' ring of the calendar

Students could come up to complete these on your calendar or it could be scaffolded, e.g. as a cloze word activity, depending on students' abilities.

Discuss with the class: when is the wet season? *ANSWER: this can vary year to year but is generally from mid-October to mid-April.* Using the 'weather' outer ring, mark and label 'wet season' on the calendar. When is the dry season? *ANSWER: the rest of the year! Mid-April to mid-October.*

This is a generalised version of the Top End seasons—some of the different cultures represented across the Top End have many more seasonal distinctions. Modify this to your situation.



Next, demonstrate how to colour/shade the 'crocodile behaviour' inner circle. Using one of your pencils/markers/highlighters, colour in the wedges underneath October, November and December. Across these wedges, write 'males fight for territory + females'.

At this point, ask the groups given this scenario earlier to now present their role-play to the class.

Next, in another pencil/marker/highlighter, colour in the 'crocodile behaviour' wedges beneath November, December, February (there will be some overlapping colour!). Across these wedges, write 'females build nests + lay eggs'.

At this point, ask the groups given this scenario earlier to now present their role-play to the class.

Next, in another pencil/marker/highlighter, colour in the 'Crocodile behaviour' wedges beneath February, March, April, May and June. Across these wedges, write 'eggs hatch, females protect young'.

At this point, ask the groups given this scenario earlier to now present their role-play to the class.

Finally, in the last colour, colour in the 'crocodile behaviour' wedges beneath July, August and September. Across these wedges, write 'quiet time – bask'. This is still a time that saltwater **crocs are deadly**, but they are less likely to be cranky.

Once the students finish writing this last section, they can all pretend to be basking crocodiles (lying in the sun on a riverbank or beach, mouth open and very still). Use your stopwatch/timer to see who can last the longest without moving!

Be Crocwise class discussion

In today's lesson, we have learnt why saltwater crocodiles can be cranky at certain times of the year. It means that they can be good protectors and defenders. But when they are defending and protecting, they are also more dangerous to anything coming into their space—even if it's by accident. **Crocs are deadly.**

Think about these stories (*from Lesson 4*). Why should people STOP and THINK about the time of year before they head out into crocodile country—to Be Crocwise—so that they are not in danger?

Story 1

One day, the Williams family went out on a fishing trip. The whole family were squeezed into a tiny boat. They don't know it, but the Williams family just went into a male crocodile's territory. Mum and dad are talking to each other about their fishing plans, big sister is singing her favourite song, and no one is paying any attention to what's around them. Little brother is bored, so he leans over the side of the boat and trails his hand in the water, making patterns.

It's time to STOP, THINK and DO.

Do you have an idea about things the Williams family should STOP doing? Ask students to list them. Ideas should include: mum and dad should stop talking and stay alert for any signs of crocodiles, sister should stop singing and be aware of what her parents are doing and saying, brother must stop putting his hands outside the boat.

Do you have an idea about things the Williams family should THINK about? Ask students to list them. Ideas should include: we are in crocodile country, so there may be crocodiles in this water, crocodiles can grow very big – even bigger than the boat, and crocodiles will protect their patch of water. Crocodiles will see you before you see them. You will not see all the crocodiles that are around you.

Do you have an idea about things the Williams family should DO to Be Crocwise? Ideas should include: keep their body in the boat, stay alert for signs of crocodiles such as slide marks, and get themselves a bigger boat.

Story 2

The Williams family are having a fun day out exploring the river bank. They are jumping off logs and climbing trees. Walking through the spear grass, they come across a cleared area with a big mound in the middle. The mound is made of sticks, leaves and mud. Dad decides to dig into the mound. This is not a good idea.

It's time to STOP, THINK and DO.

What do you think dad is digging into? *ANSWER: saltwater crocodile nest.*

Do you have an idea about things the Williams family should STOP doing? Ask students to list them. Ideas should include: stop going near the river's edge, don't walk through long grass, stop digging in possible saltwater crocodile nests.

Do you have an idea about things the Williams family should THINK about? Ask students to list them. Ideas should include: be aware of their surroundings (someone or something would have cleared the area), saltwater crocodiles can leap out of the water (stay away from the river's edge and spear grass can stop you seeing what's in front of you), know when saltwater crocodiles nest and are likely to be more protective.

Do you have an idea about things the Williams family should DO to Be Crocwise? Ideas should include: walk further away from the edge of the river, make sure they can see where they're walking, and keep well away from crocodile nests.

Reflection questions

Discuss with students: today we talked about how crocs are deadly. We learnt some of the features/adaptations that make saltwater crocodiles so good at defending and protecting. What are some of these?

Crocodiles are busy living their lives in Top End waterways. Sometimes they can be very cranky. What are some of the reasons for this behaviour? When is it most likely to happen?

What can people do to **Be Crocwise** and be extra careful at these times?

Going further:

- Add another ring to the circular calendar labelled 'human activities'. This could include school terms, holidays, or sporting or seasonal events that bring a lot of tourists in (e.g. cultural festivals, barramundi fishing). How do these things cross over with the 'crocodile behaviour' circle? Could these lead people into dangerous situations? What is something that could be done to keep people safe in crocodile country in these times?
- Measure out the crocodile sizes (see Lesson 4, page 61). How many students does it take to measure out the largest crocodile recorded?
- Create a series of mosaic tiles that depict the life cycle or history of crocodiles.
- Create a day-in-the-life story from the view of a saltwater crocodile in one of the two scenarios discussed during the lesson. Include what you have learnt about crocodile behaviour over the seasons and a Be Crocwise message.

LESSON 6 RESOURCES

Teacher

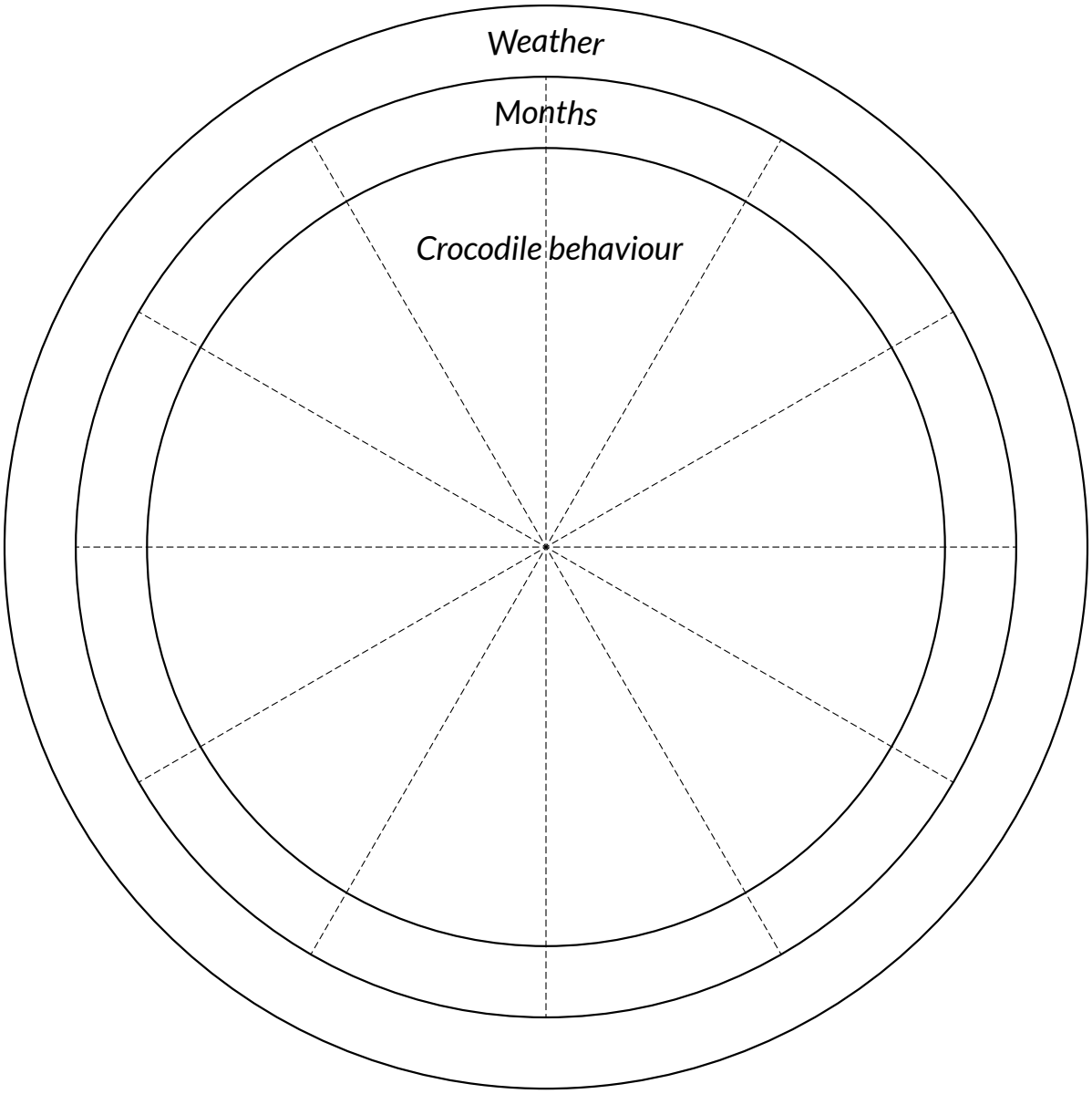
Scenario cards: saltwater crocodile behaviour

Your group will act out a boss male crocodile, keeping his territory from other male crocodiles. It is hard work. He needs the space and food for his females and their hatchlings. This crocodile does not share.
Your group are female saltwater crocodiles. You are safe in a boss crocodile's territory. You have found a place for your nest, a mound made from sticks and mud. You have laid 50 eggs. The eggs take three months to hatch. You protect your nest from egg-stealers like goannas and pigs.
Your group is a female saltwater crocodile and her hatchlings. The mother crocodile has been protecting her nest from egg-stealers like goannas and pigs. Now she hears chirping. The hatchlings are ready to come out. She helps to gently dig them out and carries them to the water. She keeps protecting them for a few months.

Student

Worksheet: croc breeding cycle

1. In the middle 'months' ring, write the months of the year in order.
2. In the outer 'weather' ring, add the wet and dry seasons in, matching them up to the correct months.
3. In the inner 'croc behaviour' circle, write when the crocodiles are defending their territory, laying eggs and eggs hatching. Some of these will overlap.
4. Cut out the calendar and glue it in the middle of a large piece of paper.


Weather
Months
Crocodile behaviour

LESSON 7 – LIVING WITH THE ULTIMATE PREDATOR

Teacher materials/preparation	Student materials
Images: freshwater and saltwater crocodile and their distribution maps	Printed handout of a freshwater and saltwater crocodile for each student
Printed worksheet: Ultimate predator – teacher/ answer version	Pen/pencil for each student
Access to internet and method of projection for video links	Printed 'adaptations and advantage' cards – number per student dependent on teacher judgement – see activity notes
Printed Be Crocwise safe behaviours displayed around the room with blue-tac/sticky tape	

Learning outcomes

Students:

- can describe the two species of crocodile in Australia
- understand that the adaptations of the saltwater crocodile make it a top predator across northern Australia (**crocs are common, crocs are deadly**)
- identify connections between a saltwater crocodile's adaptations and the safe behaviours promoted in the **Be Crocwise** campaign.

Success criteria

Students have:

- discussed what an adaptation is
- linked adaptations to an individual's and species' success for survival
- demonstrated an understanding of adaptations by identifying those of a saltwater crocodile (**crocs are deadly**)
- made connections between a saltwater crocodile's adaptations and the safe behaviours promoted in the **Be Crocwise** campaign.

Lesson introduction/brainstorm

Hand out the 'Spot the difference: saltie vs freshie' worksheet with an image of a saltwater and freshwater crocodile. Ask students: what are these animals? Are they the same? What are the differences? Ask students to identify any differences (e.g. circle/highlight) on the images.

See the Spot the difference: saltie vs freshie teacher/answer sheet for answers.

Discuss with students: there are two types of crocodiles found in Australia. The freshwater crocodile, which is found only in Australia, and the saltwater crocodile, which is also found in South-east Asia. Which crocodile is which? Students label the crocodiles on their worksheets. Point to/highlight the maps. Ask: where do we live in these maps? Are we in crocodile country? **Crocs are common!** This means that many saltwater crocodiles live in crocodile country—about the same number of people that live in Darwin!

Tell students: today we are going to learn more about the word ***adaptation*** (write this on the board) and what it means for a crocodile's survival. We are going to learn how predators are natural parts of ecosystems and how the saltwater crocodile's adaptations have helped it to become a top predator. These **crocs are deadly**—deadly in both the amazing and life-threatening ways. We will also learn how knowing the saltwater crocodile's adaptations has helped the Parks and Wildlife croc team and rangers to come up with safe behaviours for living in crocodile country.

Class discussion/activity

Ask the students to look back at the introduction pictures of the two crocodiles. These animals are difficult to tell apart in the wild, and a crocodile will see you before you see them. Treat any crocodile you see as dangerous.

Class brainstorm with Think, Pair, Share

Ask the students what they know about the word 'adaptation'. Give the definition: an adaptation is a feature that helps an organism survive and have offspring. These adaptations can be how an animal behaves, as well as how it is built.

Show the students videos of the saltwater crocodile. While watching the crocodile, ask students to identify as many features as they can that would help it to survive. If they are struggling, get them to think about these areas: *skin/body covering, eyes, ears, nose and mouth (location/shape), body shape, behaviours for hunting and parenting, position and shape of legs, arms and tail.*

Links to videos can be found at *Be Crocwise Resources*.

> **Think:** direct students to individually brainstorm as many of the adaptations they spotted in the film. Give a time limit of 2 or 3 minutes. Mark these adaptations on their worksheet.

Modify this depending on your class's ability—this activity should be kept short to focus the students and not stress them on their literacy (students can even sketch their responses).

> **Pair:** direct students to partner up with someone and continue the brainstorming together. Allow the same time limit.

> **Share:** as a class, what are some of the adaptations that were identified? Refer to teacher's notes, page 15 to information for possible answers.

Discuss with students: sometimes by looking at a creature's adaptations, you can tell what it eats, how it lives, and if and how it hunts. For instance, look again at your freshwater and saltwater crocodile pictures. The freshwater crocodile has needle-like teeth. This suggests that it eats meat (plant eaters have grinding teeth or plates) and that its food is slippery—and it is! It eats things like fish and frogs. A saltwater crocodile will eat anything it can catch—even strong animals like wallabies and even buffalo. This is why such a strong down-bite is useful and the teeth are a stronger cone-shape for holding. How can they get such big pieces of meat into their stomach? If they can't swallow it whole, they have to perform a 'death roll', a behavioural adaptation, to tear off chunks that are small enough to swallow. Saltwater **crocs are deadly**. They are at the top of the food chain. They are the ultimate predator and sometimes clash with another successful predator—us!

Class activity

Introduce the activity: with more people heading into crocodile country and because **crocs are common** *check that the students have remembered the meaning of 'common'*, the **Be Crocwise** program uses knowledge about saltwater crocodiles' adaptations to talk about behaviours to keep people safe. Around the room there are examples of these safe behaviours. I will give you cards with saltwater crocodile adaptations and how they give the crocodile an advantage.

If your class is low literacy, choose the adaptations relevant to your students' ability. You could also give copies of these adaptations to each student, or just one or two per student, depending on time or student ability.

Your task is to try to match these adaptations/advantages cards with a safe behaviour. An adaptation/advantage card may be linked to more than one Be Crocwise behaviour. Find the best fit for your cards. Use blue-tac/sticky tape to attach your card to the safe behaviour. You should be able to explain why you put your card there. When you've finished, go around the room and see where other students have put their adaptations. Do you agree/disagree with them?

As a class, visit each safe behaviour and discuss the placement of the adaptation/advantage cards.

The objective of this task is for students to be able to discuss the reasoning behind the safe behaviour 'rules'. There are many different matches possible; an adaptation/advantage card can be linked to multiple Be Crocwise safe behaviours. Students should be able to give and explain their point of view. For examples, see 'Examples of adaptation/advantage matches with Be Crocwise safe behaviours" in this lesson's resources (page 97-102 to information).

Reflection questions

- What is an adaptation? *ANSWER: a feature that helps an animal survive and have offspring.*
- Give an example of a saltwater crocodile's adaptation and how it gives the animal an advantage.
- Why does the Be Crocwise message say that saltwater **crocs are deadly**?
- Why do we need to Be Crocwise in crocodile country? ***Crocs are common.***
- What are safe behaviours to help us **Be Crocwise**?

Going further:

- Some people find it hard to obey rules. How would you come up with a way to help make sure people stay safe?
- Could you come up with some new safety behaviours?
- Design an 'ultimate' predator. Use the same guidelines (e.g. skin/body covering, eyes, ear, mouth and nose location, behaviours) to help students think about different adaptations they can select. Create a table with these headings for their predator to explain its features. This could be drawn or modelled.
- Create a chart classifying the different types of adaptations into behavioural, physiological and structural adaptations (see Teacher Notes, page 15 to information).
- Compare crocodile adaptations to those of other apex predators (e.g. sharks, lions, bears).
- Discuss adaptations of plants and animals to avoid being prey (e.g. camouflage, mimicry, warning signs).

LESSON 7 RESOURCES

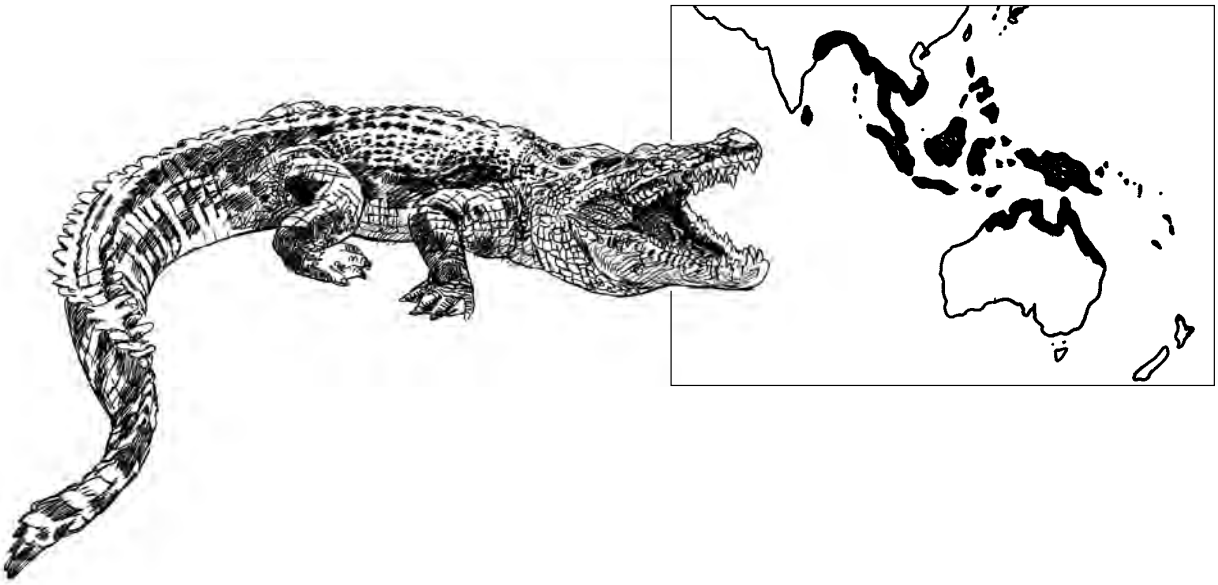
Teacher

Spot the difference: saltie vs. freshie - Answer sheet

Saltwater crocodile

ANSWERS: shorter jaw, wider jaw, stout/fat teeth, different scale arrangement – especially the 4 nuchal plates/shields on the neck. Live out of Australia.

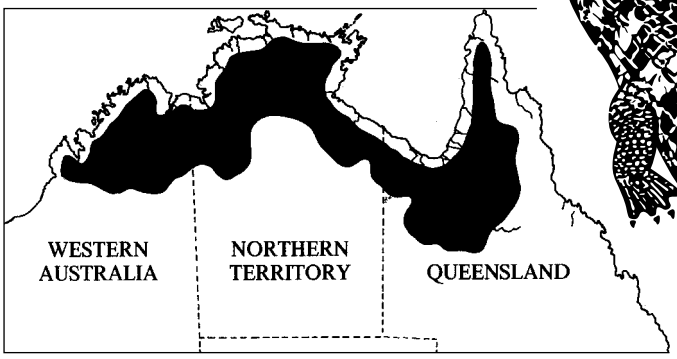
World distribution of saltwater crocodiles

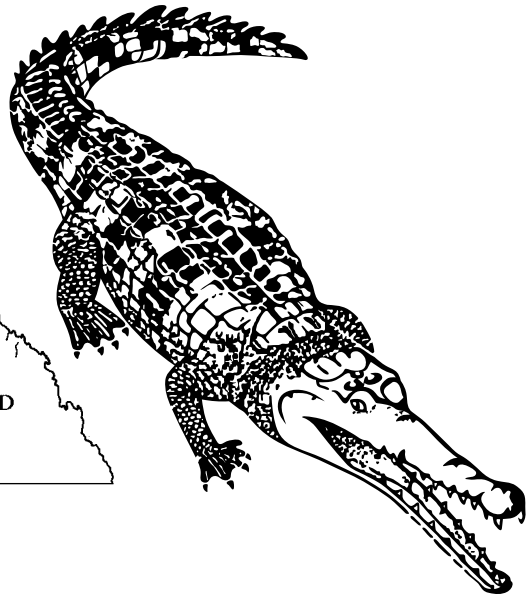


Freshwater crocodile

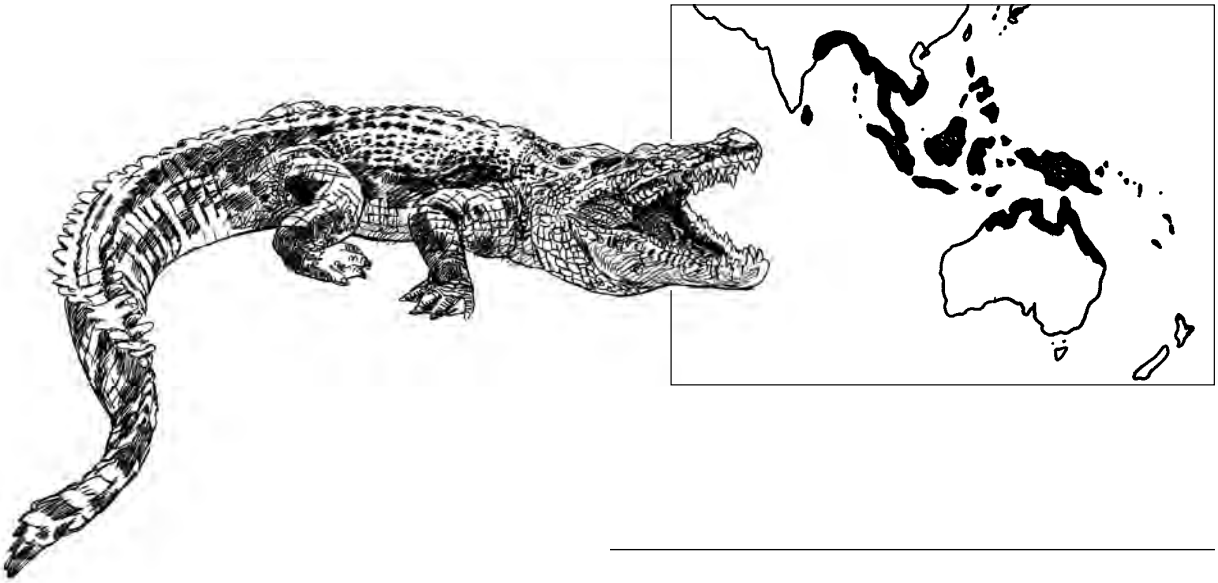
ANSWERS: narrow jaw, long jaw, needle-like teeth, different scale arrangement. Only live in Australia, don't live along the coast.

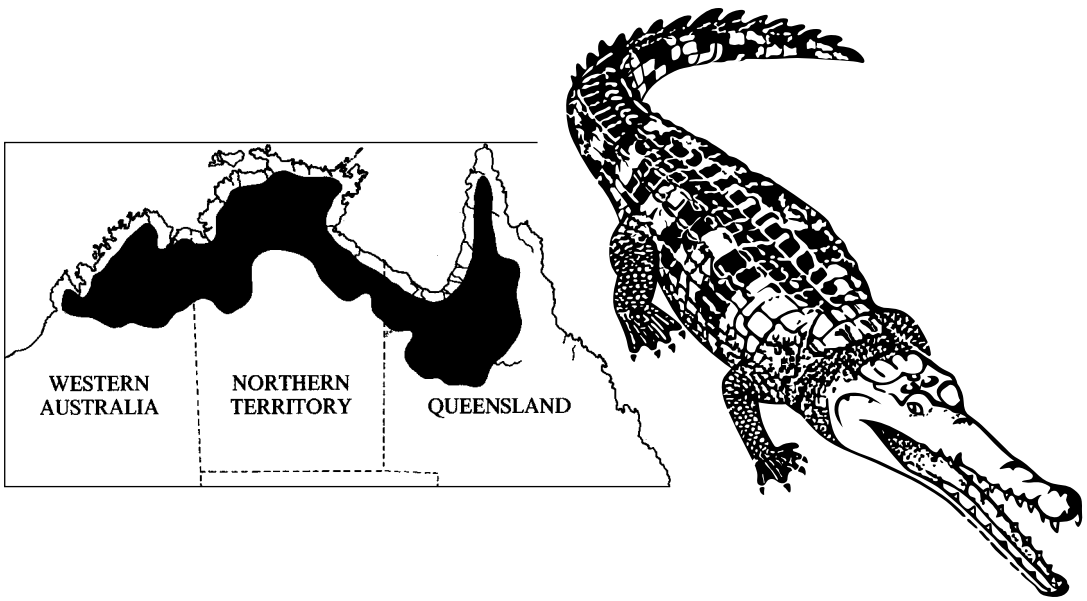
Distribution of Australian freshwater crocodiles





Spot the difference: saltie vs. freshie





Match the adaptation/advantage cards with a Be Crocwise safe behaviour

BE CROCWISE: SAFE BEHAVIOUR CARDS

Never swim in water where crocodiles may live, even if there is no warning sign.	Do not paddle or wade at the edge of water.
Always keep a watch for crocodiles.	Do not lean over the edge of a boat or stand on logs over the water.
Never provoke, harass or interfere with crocodiles, even small ones.	Try not to return to the same spot on the water's edge.
Never feed crocodiles. It is illegal and puts other people at risk.	Get rid of food scraps and fish guts properly (in bins or buried) and away from your campsite.
Be extra careful around water at night and during the breeding season (September –April).	Prepare food, wash dishes and play away from the water's edge and sloping banks.
Keep away from the edge of the water and at least 5 metres back while fishing.	Do not interfere with crocodile traps.

ADAPTATION / ADVANTAGE CARDS

ADAPTATION	ADVANTAGE
Tuck feet into side when swimming	Streamline shape means they can swim three times as fast as the fastest human swimmer or just cruise without using too much energy.
Float with only eyes, ears and nostrils out of the water	They can see, hear and smell easily, but there is very little on top of the water to see. This allows them to get close to prey without being seen. Crocodiles will see you before you see them.
Protective parental behaviour	Increases the chance that hatchlings survive.
Territorial – will defend their space and move other crocodiles out/away	Enough food and space for the boss crocodile, his females and their hatchlings.
Hard/rigid tissue at the back of their mouth	Can close off throat and stop drowning, even if mouth is open underwater.
Can close nostrils	Stops water coming in when underwater.
Muscles allow fast burst of movement on land or in water	Able to surprise and catch prey.
Reduces heart rate to 2–3 beats per minute	Allows them to spend a long time underwater to wait for prey (big crocs can stay underwater for over an hour on one breath!). Crocodiles will see you before you see them.
Special layer of cells at the back of their eyes	Can see well even when there is not much light. Crocodiles will see you before you see them.

ADAPTATION	ADVANTAGE
Excellent hearing and smell	Can see/find prey from far away even when there is not much light. Crocodiles will see you before you see them.
ADAPTATION	**ADVANTAGE**
Transparent second eyelid	Like goggles, they can swim with their eyes open and even watch prey from underwater. Crocodiles will see you before you see them.
ADAPTATION	**ADVANTAGE**
Powerful jaws	Allows them to crush and hold prey.
ADAPTATION	**ADVANTAGE**
Eyes close together and face forward	Good at judging distances, even from underwater.
ADAPTATION	**ADVANTAGE**
Muscular tail	Enables them to perform a 'death roll', lunge out of water, swim fast and propel two thirds of their body out of the water.
ADAPTATION	**ADVANTAGE**
Streamlined body with flattened, paddle-like tail	Less water resistance for faster and easier swimming.
ADAPTATION	**ADVANTAGE**
Special nerve endings in jaw and underside of body that sense vibrations in water/land	Can feel when prey or intruders approach whether they are on water or on land.

EXAMPLES OF ADAPTATION/ADVANTAGE MATCHES WITH BE CROCWISE SAFE BEHAVIOURS

Adaptation	Advantage	Be Crocwise safe behaviours – possible matches
Tuck feet into side when swimming	Streamline shape means they can swim three times as fast as the fastest human swimmer or just cruise without using too much energy.	> Never swim in water where crocodiles may live, even if there is no warning sign. > Do not paddle or wade at the edge of water.
Float with only eyes, ears and nostrils out of the water	They can see, hear and smell easily, but there is very little on top of the water to see. This allows them to get close to prey without being seen. Crocodiles will see you before you see them.	> Always keep a watch for crocodiles. > Never swim in water where crocodiles may live, even if there is no warning sign. > Do not paddle or wade at the edge of water. > Keep away from the edge of the water and at least 5 metres back while fishing. > Try not to return to the same spot on the water's edge. > Prepare food, wash dishes and play away from the water's edge and sloping banks.
Protective parental behaviour	Increases the chance that hatchlings survive.	> Always keep a watch for crocodiles. > Never provoke, harass or interfere with crocodiles, even small ones. > Be extra careful around water at night and during the breeding season (September–April). > Do not paddle or wade at the edge of water.
Territorial – will defend their space and move other crocodiles out/ away	Enough food and space for the boss crocodile, his females and their hatchlings.	> Crocs move around. > Always keep a watch for crocodiles. > Never provoke, harass or interfere with crocodiles, even small ones. > Do not paddle or wade at the edge of water. > Do not lean over the edge of a boat or stand on logs over the water. > Be extra careful around water at night and during the breeding season (September–April).

Adaptation	Advantage	Be Crocwise safe behaviours – possible matches
Hard/rigid tissue at the back of their mouth	Can close off throat and stop drowning, even if mouth is open underwater.	> Never swim in water where crocodiles may live, even if there is no warning sign.
Can close nostrils	Stops water coming in when underwater.	> Never swim in water where crocodiles may live, even if there is no warning sign.
Muscles allow fast burst of movement on land or in water	Able to surprise and catch prey.	> Always keep a watch for crocodiles. > Keep away from the edge of the water and at least 5 metres back while fishing. > Prepare food, wash dishes and play away from the water's edge and sloping banks. > Get rid of food scraps and fish guts properly (in bins or buried) and away from your campsite. > Try not to return to the same spot on the water's edge.
Reduces heart rate to 2–3 beats per minute	Allows them to spend a long time underwater to wait for prey (big crocs can stay underwater for hours on one breath!). Crocodiles will see you before you see them.	> Never swim in water where crocodiles may live, even if there is no warning sign. > Do not paddle or wade at the edge of water. > Keep away from the edge of the water and at least 5 metres back while fishing. > Prepare food, wash dishes and play away from the water's edge and sloping banks.
Special layer of cells at the back of their eyes	Can see well even when there is not much light. Crocodiles will see you before you see them.	> Keep away from the edge of the water and at least 5 metres back while fishing.

Adaptation	Advantage	Be Crocwise safe behaviours – possible matches
Excellent hearing and smell	Can see/find prey from far away even when there is not much light. Crocodiles will see you before you see them.	> Never feed crocodiles. It is illegal and puts other people at risk. > Do not interfere with crocodile traps. > Get rid of food scraps and fish guts properly (in bins or buried) and away from your campsite. > Prepare food, wash dishes and play away from the water's edge and sloping banks. > Try not to return to the same spot on the water's edge.
Transparent third eyelid	Like goggles, they can swim with their eyes open and even watch prey from underwater. Crocodiles will see you before you see them.	> Keep away from the edge of the water and at least 5 metres back while fishing. > Do not paddle or wade at the edge of water.
Powerful jaws	Allows them to crush and hold prey.	> Never feed crocodiles. It is illegal and puts other people at risk. > Do not paddle or wade at the edge of water.
Eyes close together and face forward	Good at judging distances, even from underwater.	> Keep away from the edge of the water and at least 5 metres back while fishing. > Do not paddle or wade at the edge of water. > Prepare food, wash dishes and play away from the water's edge and sloping banks. > Try not to return to the same spot on the water's edge.

Adaptation	Advantage	Be Crocwise safe behaviours – possible matches
Muscular tail	Enables them to perform a 'death roll', lunge out of water, swim fast and propel two thirds of their body out of the water.	> Keep away from the edge of the water and at least 5 metres back while fishing. > Prepare food, wash dishes and play away from the water's edge and sloping banks. > Do not lean over the edge of a boat or stand on logs over the water. > The smaller the boat, the greater the risk.
Streamlined body with flattened paddle-like tail	Less water resistance for faster and easier swimming.	> Never swim in water where crocodiles may live, even if there is no warning sign.
Special nerve endings in jaw and underside of body that sense vibrations in water/land	Can feel when prey or intruders approach whether they are on water or on land.	> Always keep a watch for crocodiles. > Do not paddle or wade at the edge of water. > Prepare food, wash dishes and play away from the water's edge and sloping banks. > Try not to return to the same spot on the water's edge.

LESSON 8 – BE CROCWISE

Teacher materials/preparation	Student materials
Video + Internet: Be Crocwise clip on YouTube A method of sharing this with students	Individual copies of the Be Crocwise script and dangerous behaviours scene
Image: dangerous behaviours (to display to students, e.g. enlarged copy, on an electronic whiteboard, OHP)	Pen/highlighter for each student
Whiteboard markers	Books
'Roll a Croc Story' instructions + dice for students to share (if needed)	Pen/pencil

Learning outcomes

Students:

> Students understand the **Be Crocwise** safety messages (**crocs are common, crocs are deadly, crocs move around, look for signs, crocs will see you before you see them**) and the reasons they exist.

Success criteria

Students have:

> participated in a class role-play on how to **Be Crocwise** and understand why these messages can keep people safe

> used their knowledge of the **Be Crocwise** messages to create a story or role-play.

Lesson introduction

Watch the Be Crocwise video clip found at *Be Crocwise Resources*.

Tell the students that today they will be talking about crocodiles—specifically saltwater crocodiles—and the safe behaviours we can do while living in crocodile country. By the end of this lesson, students will have discussed what makes these crocodiles such effective hunters/predators, participated in or watched some role-playing and discussed key messages to **Be Crocwise**. They will then use this knowledge to create a story or performance for the class.

Class activity/role-play

Hand out the Be Crocwise script and the dangerous behaviours scene to the students (see this lesson's resources page 106).

Display an enlarged version of the dangerous behaviours scene. You will narrate a script relating to this scene. Select 12 students to act out the roles of people in the story and in the scene. You'll need the following characters:

- Ranger Jay
- 3 children playing on the crocodile trap
- woman floating/swimming
- man cleaning fish on the boat ramp
- 5 people fishing in the overcrowded boat
- man fishing up to his knees in the water.

You could include more students by creating characters that may be out of sight (e.g. in the tent or car), by giving the narrating role to a student, adding another Parks and Wildlife ranger, or splitting some of the roles with one or more students.

Instruct students to highlight their character's lines in the script.

Begin the Be Crocwise role-play.

Individual/small group activity

Ask the students what they learnt from the script. Was there anything that surprised them? Tell them that they'll now use this information to create either a written story, a comic strip or a role-play to share the Be Crocwise messages with others—specifically that **crocs are common, crocs move around** and **crocs are deadly**. Write these messages on the whiteboard for students to refer to.

Students can use the information in their script and research more if they want to. Stuck for ideas? Use a die to 'roll a croc story' (see resources for this lesson). In this activity, students use a die to roll a number, which corresponds to a character. They roll again, this time selecting a setting, and again for a problem their character must overcome.

Reflection questions

> What is surprised you to learn about the saltwater crocodile?
> What are the Be Crocwise messages?
> How did you use these messages in your stories/role-plays?
> What is a behaviour that can keep you safe in crocodile country?

Going further:

> Students present their stories (written or performed) with other classes/at assembly.
> Come up with a jingle or song to help others remember the Be Crocwise messages.
> Use photos, videos or models to talk about the saltwater crocodile's adaptations (body parts and behaviour) that make them dangerous. This could be compared to other top predators.
> Look at different safety signs in your area and read their messages, e.g. road signs, beach safety, school signs. Include the Parks and Wildlife crocodile signs, page 74 and 76.
> Using one of the Be Crocwise messages, students can make their own sign to share the message with others.

LESSON 8 RESOURCES

Be Crocwise script

Display the Be Crocwise dangerous behaviours scene (page 109).

NARRATOR

The sun is shining brightly, and it's another beautiful day in the Top End. Ranger Jay is whistling a catchy tune while patrolling the park. He stops suddenly when he comes across this scene.

RANGER JAY

Woah! These people are in real danger here.

Ask the students: why do you think your characters are in danger? What do you think Ranger Jay will do?

RANGER JAY

It's really unsafe in this area with all those crocs in there. I'd better teach these people how to **Be Crocwise** around our waterways.

NARRATOR

Ranger Jay calls everyone over to sit on the lawn well away from the water's edge.

RANGER JAY (speaking with the park visitors)

Everyone looks like they are having a great time enjoying the park (people nod in agreement). But you have to be super careful around our waterways in the Top End. Crocs can be anywhere in any waterway, at any time. **Crocs are common**—there could be any number of crocodiles here. There are lots of places for them to live, like this river here (he points to the water). They also like living in billabongs and creeks, even the ocean.

Ask the students: can you see any crocodiles in the scene? How many can you find? Hold up your hand and show the number on your fingers.

WOMAN WHO WAS FLOATING/SWIMMING

How many crocs are there in the Northern Territory?

RANGER JAY

We think there are between 100 and 110 thousand salties in the NT.

WOMAN WHO WAS FLOATING/SWIMMING

True?! That's about the same as the number of people in Darwin!

MAN WHO WAS FISHING UP TO HIS KNEES

Why are there so many?

RANGER JAY

Salties were almost wiped out by hunting. They were protected in the early 1970s, but it took a while for the numbers to come back enough for people to start seeing them again. Now they are almost at the same numbers as they were before they were hunted. That's why **crocs are common** today. Many crocodiles live in croc country.

ONE OF THE PEOPLE FISHING IN THE BOAT

There's no crocs around here! We've been coming here for years!

OTHER PEOPLE FROM THE BOAT

Yeah, yeah! We grew up around this river and there's no crocs!

RANGER JAY

These crocs, they **move around**. They swim from place to place looking for food, a mate and territory. It's really easy for crocs to move around in the wet season, when the waters come up from the rains. That's when crocs have been showing up in places they used to be before hunting. This is another reason why it is really important to **Be Crocwise** up here. You see that trap over there? (Jay points to the trap, everyone looks)

KIDS PLAYING ON THE TRAP

We didn't know it was a trap! We were just having fun jumping off it!

RANGER JAY

Well, that trap is baited with meat to attract crocodiles in. They have a great sense of smell and they like an easy meal.

KIDS PLAYING ON THE TRAP

We were swimming in water with rotting meat? Ewwwwwwwwww!

RANGER JAY

We put floating foam buoys in the water when we think a croc might have moved into the area. Crocs are very curious and like testing and feeling things with their teeth. If the buoys have bite marks in them, we put in a trap. Guess what we saw on the buoys last week? That's why the trap is there.

MAN WHO WAS CLEANING FISH ON THE BOAT RAMP

I always have a look before I head down to the water. She'll be right.

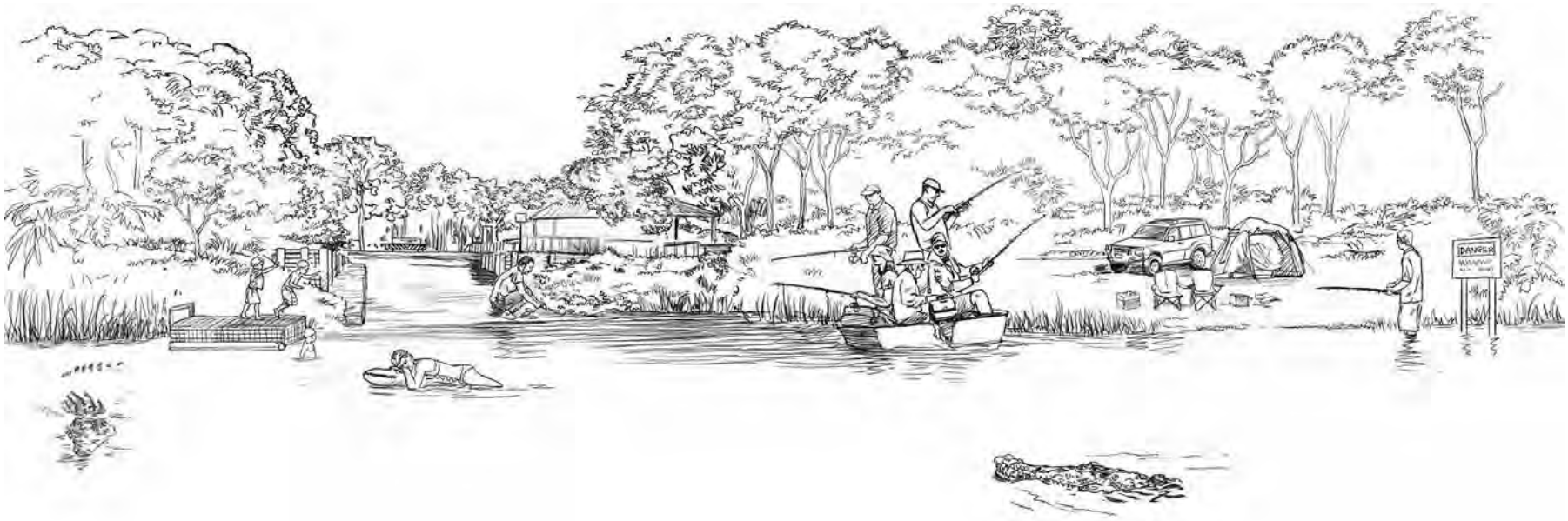
RANGER JAY

Salties are great hunters and rule our waterways. There's a number of features that make them the top predator. **Crocs are deadly**. People think this is just because of their powerful jaws and sharp teeth. But they have a powerful tail that can help launch two-thirds of their body out of the water (that's why we say to stand 5 metres back from the water when fishing). They have a great sense of smell and can smell a feed from kilometres away and come in for it (that's why we say to clean your fish and dishes away from the water because you could be endangering others, not just yourself). And their second set of eyelids that act like goggles and being able to hold their breath for over an hour means they can watch and wait underwater. **Crocs will see you before you see them**. They're deadly animals!

Teachers: the word 'deadly' has a double-meaning in the NT (and elsewhere!). It is used to mean both dangerous and amazing. Crocs really are deadly.

So do you think you can all **Be Crocwise** now? (*park visitors all nod*) Always **look for signs** (*Ranger Jay points to the sign, everyone looks*). We sometimes put up signs depending on how we manage the crocs. In some places, the risk is low enough that people can swim. Sometimes we have this sign (*Jay points to the sign, everyone looks*) that warns you that we live in crocodile country and there might be crocs in the area. It means there are crocodiles in these waters and not to go swimming. Often there are no signs at all and you have to assume that there are crocs nearby. Our parks and waterways are beautiful—there's plenty to do and see without risking our lives.

Page 2 Be Crocwise dangerous behaviours



'Roll a croc' story!

Using the information you've learnt or researched about saltwater crocodiles, create either a written story, a comic strip or a role-play to share the Be Crocwise messages with others. Your story must have one or more of these **Be Crocwise** messages:

- **crocs are common**
- **crocs move around**
- **crocs are deadly**
- **look for signs**
- **crocs will see you before you see them.**

Your story will need a character, a setting and a problem to overcome. To find these, roll the die 3 times.

First roll: look at the character column. See which character lines up with your number. Circle it.

Second roll: this number gives you the setting for your story. Circle it.

Third roll: this number is a problem your character must overcome. Circle it.

You now have a character, setting and problem for your crocodile story.

Number rolled	Character	Setting	Problem to overcome
	Crocodile hatchling	Coastline/beach	The wet season rains have caused the waterways to flood.
	Boss (male) crocodile	River	It's mating season, and male crocodiles are on the move looking for new territory and mates.
	Female crocodile with a nest or hatchlings	Floodplains	It's nesting season, and female crocodiles are super protective of their nests and hatchlings.
	Person fishing	Mangroves/ wetlands	Too many people have been fishing in the little waterhole. There are hardly any fish left! On their last cast, they have gotten their line snagged. It is their favourite and most lucky lure. They try for some time to pull it free, but it just won't budge.
	Family on a camping holiday	Harbour	The kids are playing on the beach with their dog. They start to throw a stick into the waves for the dog to chase. The dog is splashing excitedly in the water.
	Teenager hanging out with friends during school holidays	Dam	Someone is showing off to their mates or for a girl's/boy's attention. They're about to swim across and climb a crocodile trap!

MIDDLE YEARS LESSONS

Suggested year levels

Year 7 to Year 9
(NB. activities can be modified up or down to suit other levels)

Teacher notes

The teacher notes (page 8-17) give an overview of crocodile biology, adaptations, management in the NT and Aboriginal connections. These notes are the background knowledge a teacher needs to effectively use these lessons and activities.

These notes may also be useful as reference material or readings for older science and biology students.

Lessons

Early years lessons

Primary years lessons

Middle years lessons and assignments

Be Crocwise messages

These lessons have been designed to reinforce the Be Crocwise messages about crocodile safety:

	Be Crocwise	Crocs are common	Crocs are deadly	Crocs move around	Only swim where signs say it's allowed
Lesson 9	✓			✓	
Lesson 10	✓	✓		✓	✓
Lesson 11	✓	✓	✓		
Lesson 12	✓	✓	✓	✓	✓
Assignment 1	✓	✓	✓	✓	✓

Ideas for units of work

The activities can be done as standalone activities or incorporated into other units of work. Some unit topic ideas are:

> science/biology
- ecosystems
- adaptations
- energy flow/food webs

> sustainability and ethical understanding
- conservation
- environmental issues
- significance of crocodiles to Aboriginal culture

> English
- issues
- media watch
- debating

> health and physical education
- safety campaigns
- risk taking and making positive decisions.

LESSON 9 – FOLLOWING THE TRACKS

Using tracking data to map and explore how crocodiles move around

Teacher materials/preparation	Student materials
Access to YouTube	Worksheet: Tracking Moline, Koolpin and Jacob
Projector	Computer with Google Earth
Google Earth	
Access to computer lab/laptops	

Learning outcomes

Students:

- understand the different and unpredictable ways that saltwater crocs move around and can give possible reasons for this movement
- describe the methods scientists use to track animals using GPS and the possible uses for this information
- apply this understanding to safe behaviours (**Be Crocwise**).

Success criteria

Students have:

- discussed how GPS is a tool/technology used to locate points in a given space
- learnt about and practised using GPS coordinates to create fixed points on a map
- created a map of a crocodiles' movement tracked using GPS coordinates
- interpreted their map and formed conclusions based on their results
- used their findings to inform their safety recommendations.

Lesson introduction

Watch the Be Crocwise video, link found at *Be Crocwise Resources*.

Discuss with students:

- Part of this video explains that **crocs move around**. How do you think people know that they move around? *Various answers: showing up in places they were not before, seen in new places, tracks and evidence that they have been there, e.g. croc slides.*
- If you were a scientist, how could you gather information about the way a crocodile moves around? Do you know how scientists track animals? *Possible answers: observe them, follow them, measure their tracks, trapping, tag and release, GPS tracking.*
- One of the ways scientists track crocodiles is by using a Global Positioning System (GPS). We will learn more about this technology and map the movement of three different saltwater crocodiles. We will use the results to form some conclusions about the way these **crocs move around**. Why would this information be useful? (*Lead students to people's safety, i.e. knowing where crocodiles are or suggesting ways people can be safe around the waterways*). Knowing this information can help us identify ways people can Be Crocwise and stay safe in crocodile country.

Explicit teaching

To be able to use a GPS, students first need to understand how GPS technology works.

1) To help people know their location in the world, people have divided the globe up with imaginary lines to form a grid system. These lines run horizontally (latitude) and vertically (longitude) and each line has its own number. This means that point/place in the world has its own latitude and longitude numbers. These numbers are known as a 'coordinate' and relate to that point or place.

2) **GPS = Global Positioning System.** This is technology that locates a point anywhere on the globe. A GPS device needs information from satellites (3 or more to be accurate—there are 27 satellites in total) orbiting Earth to pinpoint a location and give its coordinate. Search for a video to explain this further (e.g. YouTube video '*how GPS works*').

3) GPS coordinates can be calculated by hand on a map or by using programs like Google Earth. The distance between coordinate points can also be measured.

Investigation

Hand out the worksheet 'Tracking Moline, Koolpin and Jacob' to students.

This task can be completed individually for all three crocodiles, or the class can be split to form 3 groups, with each group investigating a different crocodile and compiling their results for class discussion.

Direct the students (instructions repeated on their worksheet):

> Open Google Earth – you will use this program to map the movements of the three saltwater crocodiles: Moline, Koolpin and Jacob.

> Under 'tools', 'options', '3D view', make sure the 'show lat/long' option is selected on 'degrees, decimal minutes'.

> To enter/plot a GPS coordinate (these are also known as waypoints), click on the thumbtack, which will open a box.

The sequence of GPS coordinates given for each of the crocodiles are recorded by the date they were collected. When turning each of these coordinates into a waypoint on Google Earth, the date is used to label or 'name' the waypoint - this enables you to clearly see where the crocodile was on a particular date and follow their movement.

> Under 'name', enter the first date listed for your crocodile. Enter the coordinates (latitude is the first number and ends in S for south: e.g. 13°33'S. Longitude is the second number and ends in E for east: e.g. 132°35É). Click OK.

> Repeat for the other coordinates.

> These coordinates should now appear on the left-hand side under 'places'. Double click on the earliest date/title to zoom to that location.

By zooming in and out, students will be able to see how different river systems join, the type of environments the crocodiles move through and other topographical features. Students can write a description of the environments each crocodile moved through on its journey.

To understand how the crocodiles moved and the environments they moved through, have students read their crocodile's story (on the worksheet).

Class discussion

When they've finished, have students Think (individually brainstorm), Pair (discuss with a partner), Share (with the class) what they've discovered. What information do they think is important for people to know?

As a class, have students walk around to see each other's maps summarising the three crocodiles' paths and any patterns. *For example, each crocodile travelled different distances—one hundreds of kilometres, another just around the area, each moved over the course of a wet season, etc.*

Ask the students what the coordinates of their crocodile's journey can tell us about saltwater crocodiles and their movement. What are their conclusions?

> Are there any similarities between the time crocodiles are likely to move? (*ANSWER: yes, wet season – higher water levels allow for easier swimming, which is their main mode of travel*).

> Why do you think crocodiles move around? (*VARIOUS ANSWERS: to find a mate, discover and establish new territory, follow food*).

> Do you think it's possible to predict how far a crocodile will travel? (*ANSWER: unlikely – look at the differences between the individual crocodiles!*).

Ask the students: what does this information mean for people living in crocodile country? How can this information be used to keep them people? Can you make recommendations for locals and people managing the crocodiles based on this information?

Various answers, but some could include:

- *There is no way to predict how far a saltwater crocodile will travel.*
- *Saltwater crocodiles can appear in places they've only been seen since before they were hunted.*
- *Rangers could increase surveys after the wet season (but there's only so many rangers, so maybe they could focus on places people like to swim).*
- *It's impossible to 'know' an area or a swimming hole has no saltwater crocodiles in it, no matter how many times you've been there before.*

Ask the students the following reflection questions

- What are four things that surprised you from today's activity?
- What are three conclusions you can make about the movement of saltwater crocodiles?
- What are the two lines (vertical and horizontal) that divide the globe called?
- What is one recommendation for anyone living in crocodile country?

Going further:

- Create a campaign to share your information on how saltwater **crocs move around**. Suggest ways that people can stay safe in crocodile country.
- Invite a scientist to come and talk about tracking animals. Try contacting biodiversity scientists in the Department of Environment and Natural Resources, local land management groups (e.g. Northern Land Council or Bawinanga Aboriginal Corporation), Charles Darwin University or the CSIRO.
- In pairs or small groups, use a GPS to generate a series of coordinates and create a treasure hunt. The hunt could be themed, with each location tied to a story, and students get more of the story with each coordinate they find, or it could be a fact-finding hunt where students collect information about a 'who am I?' object or animal species. Or it could simply be an orienteering course. The class can then go on the hunt together or each pair/small group allocated a hunt randomly (drawn from a hat).
- Research methods of navigation before electronic technology existed. Have a go at plotting coordinates on a map by hand!

LESSON 9 RESOURCES

Student worksheet: 'Tracking Moline, Koolpin and Jacob'

GPS tracking helps Parks and Wildlife rangers understand more about how saltwater crocs move around. Below are stories and coordinates of three saltwater crocodiles: Moline, Koolpin and Jacob, who were tracked by GPS in Kakadu National Park managed by Parks Australia.

Read the crocodiles' stories, track their movements by mapping their coordinates and then describe each location.

Mapping the coordinates using Google Earth

1) open Google Earth
2) under 'tools', select 'options, then look at the '3D view' tab. Under 'degrees, decimal minutes', make sure the 'show lat/long' option is selected
3) to enter/plot a GPS coordinate (these are also called 'waypoints'), click on the thumbtack, which will open a box.

The sequence of GPS coordinates given for each of the crocodiles are recorded by the date they were collected. When turning each of these coordinates into a waypoint on Google Earth, you use the date to label or 'name' the waypoint - this enables you to clearly see where the crocodile was on a particular date and follow their movement.

4) Under 'name', enter the first date listed for your crocodile. Enter the coordinates (latitude is the first number and ends in S for south, e.g. 13°33'S. Longitude is the second number and ends in E for east, e.g. 132°35É). Click 'OK'
5) repeat for the other coordinates
6) these coordinates should now appear on the left-hand side under 'places'. Double click on the earliest date/title to zoom to that location
7) Zoom in and out by using the roll button on the mouse. Look at how different river systems join, the type of environments the crocodiles move through and other features of the land. Write a description of the environments that each crocodile moved through on its journey (e.g. coastal, river, floodplain).

Moline's story

Moline is a 4.3 m male saltwater crocodile who lived in the freshwater section of Mary River, near the Mary River Roadhouse, from 2005 to 2009. From October 2009 to January 2010, Moline made some dramatic changes. First, he went downstream along the Mary River, out of the freshwater system and into the tidal part of the river. He then travelled out to sea and headed east into the South Alligator River system and up into the freshwater system of Nourlangie Creek, where he stayed for a month or so near Nourlangie Camp. Moline's journey would have been dangerous for him, taking him through numerous territorial zones of other saltwater crocodiles. As this time of the year is the breeding season for saltwater crocodiles, other males would have been aggressively protecting their territories and female crocodiles.

GPS coordinates of Moline's journey

Date	Coordinates	Description of the environment
11.10.2009	13o36'S 132o09'E	
15.10.2009	13o34'S 132o09'E	
23.10.2009	13o32'S 132o04'E	
31.10.2009	13o21'S 131o57'E	
14.12.2009	12o50'S 131o39'E	
18.12.2009	12o34'S 131o50'E	
22.12.2009	12o34'S 131o43'E	
07.01.2010	12o16'S 131o56'E	
07.01.2010	12o17'S 132o01'E	
11.01.2010	12o31'S 132o25'E	
11.01.2010	12o35'S 132o28'E	

Koolpin's story

Koolpin is a 3.8 m male saltwater crocodile who was trapped in the South Alligator River near Koolpin Road crossing on 7 December 2009. During the start of 2010, after the creek flooded from wet season rains, Koolpin moved in and out of Koolpin Gorge three times. This result is significant for park rangers from Parks Australia because it helps them to make decisions about swimming in Koolpin Gorge and other areas.

GPS coordinates of Koolpin's journey

Date	Coordinates	Description of the environment
07.12.2009	13 o33'S 132 o33'E	
31.01.2010	13 o33'S 132 o20'E	
04.02.2010	13 o33'S 132 o34'E	
08.02.2010	13 o34'S 132 o35'E	
11.02.2010	13 o31'S 132 o33'E	
15.02.2010	13 o00'S 132 o34'E	

Jacob's story

Jacob is a 4.2 m male saltwater crocodile. He was originally captured at Cahill's Crossing on 14 May 2009. Once wet season flooding started, he began to move long distances upstream and downstream (up to 30 km downstream) from the Cahill's Crossing capture site. As of February 2010, he was living in an Arnhem Land billabong a few kilometres east of where he was originally captured.

**In March 2017, Jacob, who had been known to be a 'bit naughty' around fishermen in the past, began approaching children and dogs. Because of the danger of this behaviour, he was shot.

GPS coordinates of Jacob's journey

Date	Coordinates	Description of the environment
14.05.2009	12° 26'S 132° 59'E	
31.01.2010	12° 26'S 132° 59'E	
03.02.2010	12° 24'S 132° 59'E	
07.02.2010	12° 24'S 132° 58'E	
11.02.2010	12° 25'S 132° 57'E	

LESSON 10 – WHEN TO CAGE THE CROC

Teacher materials/preparation	Student materials
A projector for video and images	Desktop/laptop computer with a spreadsheet/data entry program
Link to images of crocodiles in traps found at *Be Crocwise Resources*	Worksheet 'croc captures data'
Link to video found at *Be Crocwise Resources*	
Link to crocodile capture data base found at *Be Crocwise Resources*	
Managing saltwater crocodiles – information cards	
Spreadsheet/data entry program (such as Excel)	

Learning outcomes

Students have:

- organised and analysed data on saltwater crocodile captures to create a series of graphs
- interpreted their graphs and identified key points in this data in relation to location, and yearly and seasonal changes
- used their interpretation of their data to make inferences on crocodile management
- understood how saltwater crocodiles are managed in the Northern Territory, that you should only swim in designated swimming areas, that **crocs move around**, that **crocs are common** and can describe **Be Crocwise** behaviours needed in croc country.

Success criteria

Students have:

- learnt how the Northern Territory Government manages crocodiles
- created a series of graphs on saltwater crocodile captures (yearly, seasonally, locally)
- discussed and made suggestions on management directions
- identified that **crocs move around** and can describe safe **Be Crocwise** behaviours needed in crocodile country.

Lesson introduction/brainstorm

Start the lesson by showing the images of saltwater crocodiles and crocodile management at the bottom of the website page 'Be Crocwise Learning Materials and Talks' - find the link to this website at *Be Crocwise Resources*.

Discuss with the students: in today's lesson, you'll learn how saltwater crocodiles are managed and why this is important to the Northern Territory. Did you know that saltwater crocodiles were almost hunted to extinction? Because crocodiles are such an important part of the Top End ecosystem, the NT Government made them a protected species in 1971, so they could no longer be hunted. At the time they were protected the wild population was thought to be less than 3000 across Australia.

Since hunting ceased, crocodile numbers have increased again and are now almost to the same numbers that they were before. Unfortunately, because there are also many more people living in the Top End, there are now more chances of people and crocodiles coming into contact with each other. The saltwater crocodile is an apex predator (at the top of a food chain)—**crocs are deadly!** Did you know there is a crocodile management team and other rangers working to keep people safe?

Watch this video to see why crocodiles are so important to the Northern Territory and how they are managed.

Show the croc catchers video, link available at *Be Crocwise Resources*.

In this lesson, you will learn about how the NT Government manages saltwater crocodiles and create some graphs to see if you can spot any patterns. With these patterns, you can make suggestions to improve this management.

Group activity

Tell the students: the croc management team and other rangers use three types of strategies to manage saltwater crocodiles. Split the class into three teams. Allocate one strategy to each group by handing them the cards for that strategy. They become a specialist group for that strategy and will report back to the class.

NB: there are five information cards for each management strategy. If you have more students, the sign examples in strategy 2 and 3 could be split between two students, or the larger information cards could be shared between pairs.

Give the students enough time to process the information on their card and to have a practise run of presenting as a group. Taking it in turns, have each of the three groups share their information with the rest of the class.

Discuss with the class: we now know that the croc management team and other rangers trap crocodiles in designated swimming areas or to remove a ***problem crocodile*** (a crocodile that is acting aggressively/cranky or has attacked boats, pets or people).

Some of these traps are in place permanently at locations where crocodiles are continually removed, like in Darwin Harbour (e.g. in the Katherine River).

Tell the students: the croc management team appreciates people calling them when there's a crocodile in a trap. But they don't like hearing about people climbing on the traps! Traps are baited with meat, and the smell of the meat attracts crocodiles. Believe it or not, some people are foolish enough to climb onto traps!

To report problem crocodiles or anyone interfering with a croc trap, phone:

> Darwin: 0419 822 859 or (08) 8983 2475

> Katherine: 0407 958 405 or (08) 8973 8888.

Explicit teaching/individual task

Tell the students: in the next part of the lesson, we'll look at information about where and when saltwater crocodiles have been captured and search for any patterns. Using this information, we can make suggestions about where traps should be placed and how many are needed.

Introduce the information tables in the student worksheet 'croc captures data'. The data has been collected and recorded by the Parks and Wildlife croc management team and wildlife scientists. Ask the students to identify what information has been collected in the three tables. *ANSWERS: annual captures 2005–2016, monthly captures 2007–2016 and the location of saltwater crocodile captures over time (2014–2016).*

Discuss with students: putting information into graphs can help us to see patterns more easily. Can you predict what the information or patterns in these tables might show us?

Open the spreadsheet program and demonstrate how to use a spreadsheet and form a table. ***Or you could download an Excel copy of the data from the Be Crocwise website.*** Ask students what a table should include. *ANSWERS: title, column headings, data in columns.*

Once the data is entered, demonstrate how to turn it into a graph. Discuss how to select an appropriate graph (e.g. sequential data should use a line graph, comparative data with a bar or column graph). ***NB: the amount of data could be modified depending on the class ability and time limitations.*** Ask students what a graph should include. *ANSWERS: title, axes headings, a key etc.*

Allow time for the students to enter/download the data and generate their graphs. Encourage them to switch between different graph types. Students should answer the questions in their 'croc captures' worksheet.

Class discussion

Give students an opportunity to share their results with the class. See the 'croc capture answer sheet' to guide these discussions.

Reflection questions

> What happened in the past that caused the need for saltwater crocodiles to be protected? *They were almost hunted to extinction.*

> What are the three different strategies used to manage saltwater crocodiles in the Northern Territory? *Exclusion, no tolerance, problem crocodiles removed.*
  - If you **look for signs**, what variations could you see in each of the areas? *Refer to the signs from the management activity.*

> What did your graphs tell you about crocodile numbers? *They don't seem to be increasing anymore, which suggests their numbers are either being controlled or are back or close to the population size before hunting.* ***Crocs are common.***

> What did your graphs tell you about crocodile behaviour? ***Crocs move around.***

Going further

> Create a map showing the location of the traps (see Lesson 5 'Trapping for Safety').

> Conduct a community meeting about crocodile culling (see Lesson 12 'Taking Sides').

> Examine media reports about people interacting with crocodile traps (the ABC News, NT News and local papers regularly publish articles relating to crocodiles (https://becrocwise.nt.gov.au/news-and-media). Discuss inappropriate behaviour around crocodile habitats and crocodile traps (see Lesson 13 'Risky Business')

> Contact Parks and Wildlife to find out about crocodile management in your local area. Discover if your recommendations are the real-life actions of the crocodile management team and Parks and Wildlife rangers.

LESSON 10 RESOURCES

> find a link to view a map of crocodile captures at *Be Crocwise Resources*.
> managing saltwater crocodiles – information cards
> 'croc captures' worksheet and answer sheet.

Managing saltwater crocodiles – information cards

NB: for each management type, there are five management information cards

Management type 1: exclusion
Management goal:
To prevent all saltwater crocodiles from entering an area so that the level of risk is low enough to recommend/ allow swimming e.g. Wangi Falls, Litchfield National Park.

Management type 1: exclusion
Are water based activities safe?
Safe for swimming and other water based activities.

Management type 1: exclusion
Are there saltwater crocodiles present?
Extremely unlikely when open for swimming

Management type 1: exclusion
What do the signs say?
May be closed sometimes, e.g. during Wet Season or if a crocodile has been sighted.
There are 'Swimming Open' or 'Swimming Closed' signs.

Management type 1: Exclusion

Management Type 2: No Tolerance
Management goal:
To significantly reduce the risk of attack by removing any crocodiles that enter the area e.g. Darwin Harbour and outer Darwin residential areas.

Management Type 2: No Tolerance
Are water based activities safe?
Not safe for swimming except in patrolled areas. Other water based activities allowed with care.

Management Type 2: No Tolerance
Are there saltwater crocodiles present?
Low chance, but possible

Management Type 2: No Tolerance
What do the signs say?
'Crocodile Safety' signs – Please note, not all areas have signage; if there is no designated swimming area sign then crocodiles may be present.

Management Type 2: No Tolerance

Management Type 3: Problem Crocodiles Removed
Management goals:
Only problem crocodiles are removed (*Problem crocodile = any crocodile that is acting aggressively/cranky or has attacked pets or people*) e.g. Fogg Dam Conservation Area.

Management Type 3: Problem Crocodiles Removed
Are water-based activities safe?
Not safe for swimming. Other water based activities allowed with extreme caution.

Management Type 3: Problem Crocodiles Removed
Are saltwater crocodiles present?
Depends on the location, but assume there is a high chance

Management Type 3: Problem Crocodiles Removed
What do the signs say?
'Crocodile Safety' signs – Please note, not all areas have signs; if there is no designated swimming area sign then crocodiles may be present.

Management Type 2: No Tolerance

Croc captures

In 1971, saltwater crocodiles became a protected species in the Northern Territory. This was because hunters had been killing them for their skins and they had almost become extinct! Since then, the population of saltwater crocodiles has increased, and there are now almost as many saltwater crocodiles as there are people living in Darwin (estimated around 100 000 to 110 000). **Crocs are common**—many crocodiles live in crocodile country. As the human population has also increased, there are now more chances for crocodiles and people to clash. The Northern Territory Government has a Crocodile Management Plan that aims to protect saltwater crocodiles while also keeping people safe. To do this, they have places where:

1) any saltwater crocodile is removed and actively stopped from entering (to reduce the risk enough that people can swim there) = **exclusion**
2) most of the crocodiles are removed (lowers the risk enough that people use the waterways, just not for swimming) = **no tolerance**
3) saltwater crocodiles are left alone (unless they attack a person or act aggressively) = **problem crocodiles are removed.**

More than 80 traps are placed in waterways across the Northern Territory. The following information on saltwater crocodile captures has been collected by the Parks and Wildlife crocodile management team and wildlife scientists.

Use this data to create graphs, find any patterns and make recommendations for crocodile management.

Questions for the data

Total saltie captures

1. Can you see any patterns or trends in your graph? If so, suggest reasons for the increases/decreases.

.....

.....

.....

2. Why do you think some years have more crocodiles captured than others?

.....

.....

.....

Questions for the data...

A decade of monthly saltwater captures (2007–2016)

1. Can you see any patterns or trends in your graph? If so, suggest reasons for the increases/decreases.

2. Have a look at the two spikes in every year (normally around April and the other around October/November). These spikes are connected to the weather. What happens at these times of the year?

3. Why do you think crocodiles move around at these times of the year?

Questions for the data

Location of saltwater crocodiles captures

1. Can you see any patterns or trends in your graph? If so, suggest reasons for the increases/decreases.

2. There are different saltwater crocodiles caught in the same location year after year. What do you think this says about the crocodile's behaviour?

From your answers above, what are your recommendations on where and when the traps should be placed?

Where:

When:

What are your recommendations for people living or visiting waterways in northern Australia?

Croc capture data

A decade of monthly saltwater captures (2007–2016)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	14	22	24	35	31	23	14	22	24	15	14	13
2008	15	9	29	34	10	10	14	19	22	17	20	14
2009	21	22	28	30	18	16	14	15	18	17	18	16
2010	20	25	30	33	35	30	21	27	14	19	30	24
2011	10	23	36	45	21	10	20	10	30	20	22	26
2012	21	30	26	34	33	30	18	18	26	26	28	28
2013	15	15	21	33	30	14	12	20	16	22	11	18
2014	13	22	43	36	38	23	18	17	17	23	18	19
2015	22	26	25	44	26	19	5	18	16	34	24	21
2016	14	21	22	32	23	19	13	15	18	12	15	23

Location of saltwater crocodiles captures

Location	2014	2015	2016
Adelaide River	1	1	0
Adelaide River township	0	0	1
Berry Creek	15	22	12
Bing Bong	0	14	1
Blackmore River	10	8	4
Borroloola	2	9	1
Bynoe Harbour	10	6	1
Cobourg	4	3	0
Daly River	6	3	0
Darwin	8	7	8
Darwin River Dam	0	2	0
Douglas River	1	1	2
East Arm	11	13	12
Elizabeth River	19	15	12
Elizabeth River downstream	19	15	12
Elizabeth River upstream	1	1	1
Elsey NP	0	0	0
Fogg Dam	1	3	2
Hope Inlet	45	42	32
Howard River	3	2	1
Howard River upstream	2	0	2
Howard Springs	2	0	0
Jabiru	0	0	0
Katherine River Trap 1	7	3	3
Katherine River Trap 2	2	1	0

Location	2014	2015	2016
Katherine River Trap 3	0	1	4
Katherine River Trap 4	3	0	0
Leaders Creek	3	0	2
Maningrida	0	0	0
Manton Dam	0	3	0
Mary River	0	2	0
Middle Arm	4	7	7
Nhulunbuy	5	0	0
Northern suburbs (Darwin)	27	41	30
Oenpelli	0	0	0
Palmerston	19	10	8
Pioneer Creek	11	5	6
Ramingining	0	0	0
Roper River	2	1	0
Shady Camp	0	0	0
Southport	9	11	8
Wagait	6	1	5
Wangi Creek	4	2	2
West Arm	22	20	16
Woods Inlet	19	16	10
Total caught	**287**	**280**	**205**

Total saltie captures

Year	Number caught
2005	238
2006	242
2007	251
2008	213
2009	233
2010	308
2011	273
2012	318
2013	227
2014	287
2015	280
2016	205

Croc captures – answer sheet

In 1971, saltwater crocodiles became a protected species in the Northern Territory. This was because hunters had been killing them for their skins and they had almost become extinct! Since then, the population of saltwater crocodiles has increased, and there are now almost as many saltwater crocodiles as there are people living in Darwin (estimated around 100 000 to 110 000).

As the human population has also increased, there are now more chances for crocodiles and people to clash. The Northern Territory Government has a Crocodile Management Plan that aims to protect saltwater crocodiles while also keeping people safe. To do this, they have places where:

1) any saltwater crocodile is removed and actively stopped from entering (to reduce the risk enough that people can swim there) = **exclusion**
2) most of the crocodiles are removed (lowers the risk enough that people use the waterways, just not for swimming) = **no tolerance**
3) saltwater crocodiles are left alone (unless they attack a person or act aggressively) = **problem crocodiles are removed.**

More than 80 traps are placed in waterways across the Northern Territory. The information found on page 134-137 and online on saltwater crocodile captures has been collected by the Parks and Wildlife crocodile management team and wildlife scientists.

Use this data to create graphs, find any patterns and make recommendations for crocodile management.

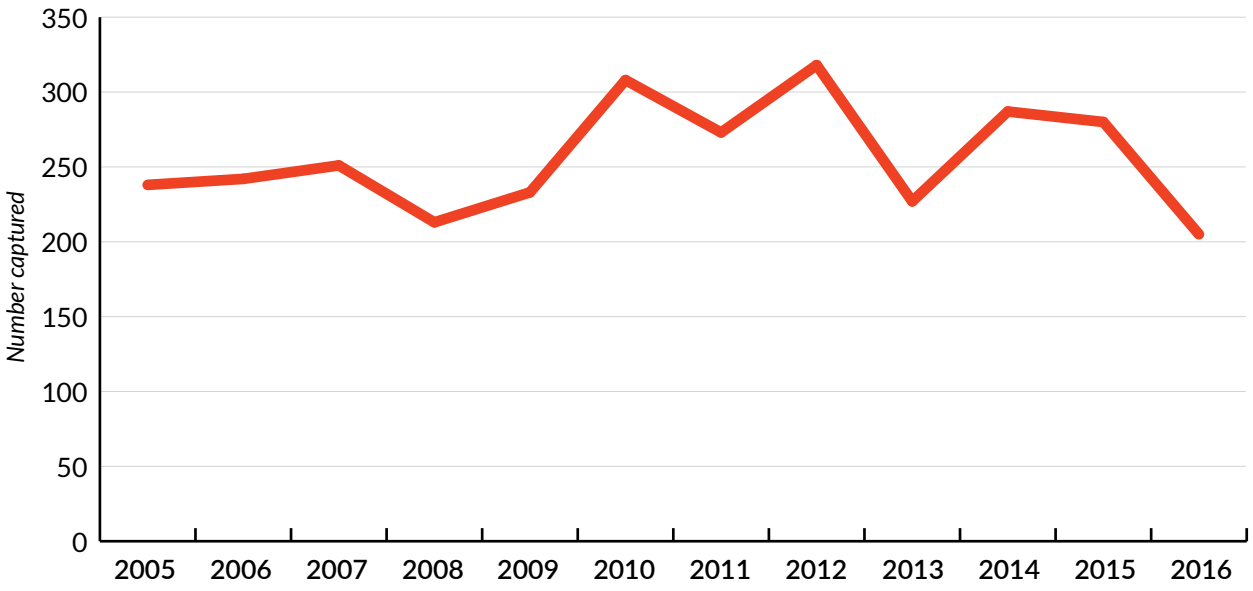
Questions for the data

Total saltie captures

1. Can you see any patterns or trends in your graph? If so, suggest reasons for the increases/decreases.

Example of the graph students can generate:

Total saltwater crocodiles captured 2005–2016



There is no obvious pattern. It is not a smooth line. On average, the number of captures doesn't appear to be increasing, at least not dramatically.

2. Why do you think more crocodiles were captured in some years ?

Longer wet seasons mean there is more time to move and find mates, territory and food—and more time and chance to get captured.

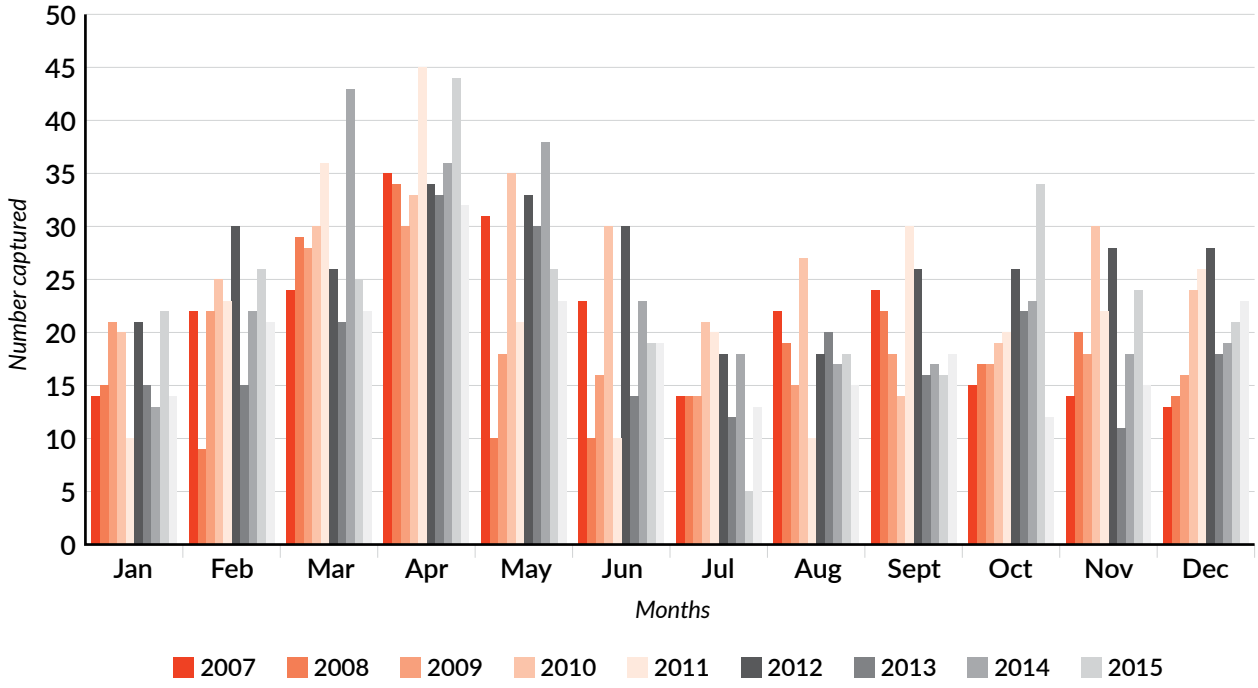
Questions for the data

A decade of monthly saltwater captures (2007–2016)

1. Can you see any patterns or trends in your graph? If so, suggest reasons for the increases/decreases.

Example of the graph students can generate:

A decade of monthly saltwater crocodile captures, 2007–2016

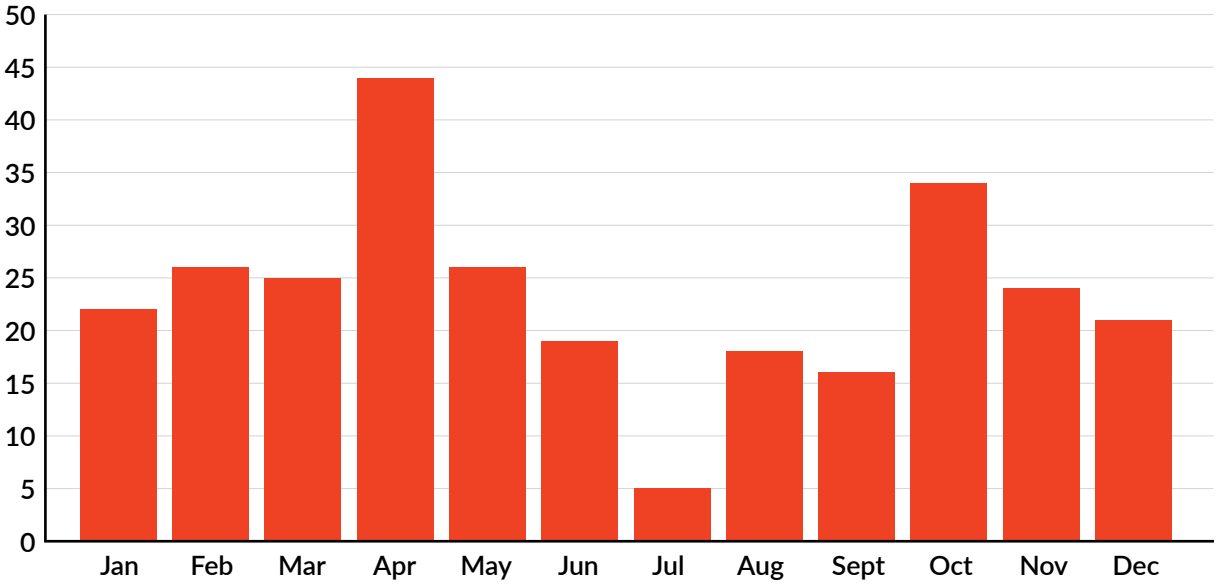


Overall, the graph creates a wave with two peaks, smoothly increasing, then decreasing, before another increase (not as high) and a slight decrease.

2. Have a look at the two spikes in every year (normally around April and the other around October/November). These spikes are connected to the weather. What happens at these times of the year?

Please see the graph on page 140 of just one year (2015) to highlight the peaks and troughs.

Number of saltwater crocodiles caught in 2015



'Number of saltwater crocodiles caught in 2015' is an example to highlight the spikes described in the question. These spikes are linked with the months that the wet season both started and ended, indicating times when a) the crocodiles are moving around at the start and end of the rainy season and b) when more traps are placed as waters are calmer after the rainy season has finished.

3. Why do you think crocodiles move around at these times of the year?

To find mates, establish territories and follow food sources.

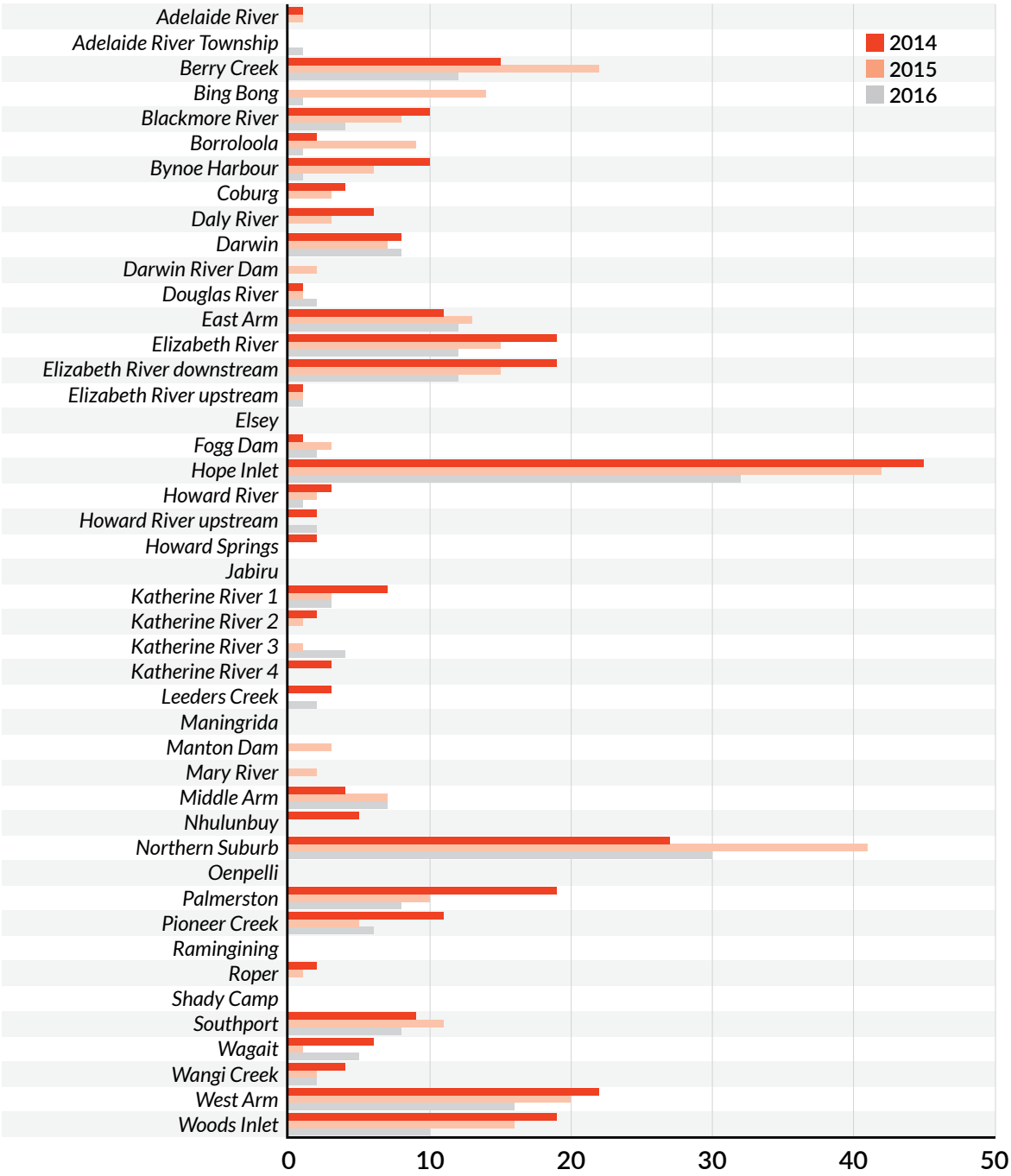
Questions for the data

Location of saltwater crocodile captures

1. Can you see any patterns or trends in your graph? If so, suggest reasons for the increases/decreases.

Example of the graph students can generate:

Location and number of saltwater crocodile captures, 2014–2016



The graph shows the number of crocodiles caught at different locations around the NT. In some places, the number of crocodile captures has dropped over time. In others, it has increased.

2. There are different saltwater crocodiles caught in the same location year after year. What do you think this says about crocodiles' behaviour?

Saltwater crocodiles move around. When you remove saltwater crocodiles from their territory, new crocodiles move into the space.

From your answers above, what are your recommendations on where and when the traps should be placed?

> Where:

As a priority on places with higher numbers of saltwater crocodile captures.

.....

.....

> When:

As a priority, at the start and end of the wet season.

.....

.....

What are your recommendations for people living or visiting waterways in northern Australia?

***Crocs move around** – people need to be aware that even in places where crocodiles have been removed, new crocodiles can move in. Crocodiles can also move into places they have not been seen since before they were hunted. People need to especially be aware of crocodiles at the start and end of the wet season.*

***Look for signs.** They will tell you if the risk of crocodiles is low enough to swim.*

LESSON 11 – IT'S ALL CONNECTED

Creating and Destroying a Food Web

Teacher materials/preparation	Student materials
Access to YouTube and a method of projecting the images	Workbooks
3 x energy arrows (to be used in both food chain examples)	'Creating and destroying a food web' worksheet
Name stickers/paper tags labelled: > sun > grass > deer > wolf	A3 paper
Images for food chain demonstration: > sun > grass > wallaby > crocodile	
Enlarged organism pictures (printed for students to tape/pin/hang onto themselves) from the 'Creating and destroying a food web' worksheet	
String/flagging tape (preferably something easy to see and tear/cut)	

Learning outcomes

Students:

> understand that energy moves through ecosystems and can describe how this energy is used

> can describe where the saltwater crocodile sits as part of a food chain/web and its importance within it

> understand that **crocs are common** and that **crocs are deadly.**

Success criteria

Students:

- have watched a video clip on the importance of top predators to an ecosystem (trophic cascades)
- know the history of the saltwater crocodile and why they needed to be protected
- know that today, **crocs are common**—many crocodiles live in crocodile country
- have contributed to a class brainstorm on why living things need to eat, the characteristics of top predators and the reasons **crocs are deadly**
- can show how energy enters and moves through a food chain/web
- have created a food chain and web.

Lesson introduction/brainstorm

Display pictures of theorganism from the 'Creating and destroying a food web' worksheet as students enter the classroom (e.g. this could be done on a whiteboard or as printed images). Ask the students what they think the connection between these organisms is. *ANSWER: all belong in the Top End and are linked together (specifically, within a riverine ecosystem).*

Tell the students: today we are going to learn about energy and how it moves through living things. We will create a food chain and a food web to show this energy path, and we'll make a food web with the saltwater crocodile as a specific example. We will also investigate why **crocs are deadly**, and suggest ways humans can keep themselves out of a crocodile's food web and **Be Crocwise.**

Class discussion

Discuss with the class: can you give some examples of top predators? (examples could include sharks, lions, tigers and hopefully crocodiles). What do all of these have in common? What kinds of characteristics are we thinking of? In the tropical north of Australia, saltwater crocodiles are the top predator. These **crocs are deadly**—deadly in both the amazing and life-threatening ways. What kinds of characteristics make them so dangerous? *VARIOUS ANSWERS: use adaptations information in Teacher Notes to direct discussion.*

Because of the fear of large predators, some people want them all to be removed to reduce the risk to people or their livestock. Sometimes these apex predators are removed for other reasons, like being harvested to make money from the animal's skin, teeth and meat. But removing a top predator from a food web has more outcomes than just making people feel safer. This happened at Yellowstone National Park in the USA, where the wolves had disappeared due to hunters or because the wolves were hunting livestock. After the wolves disappeared, some surprising consequences filtered through the ecosystem, including

behaviour changes in the animals the wolves had hunted, changes to the types of plants in the whole park and even how the rivers shaped the landscape. Seventy years later, a small number of wolves were returned to the area. This is what happened.

Show the video '*How Wolves Change Rivers*' - link available at *Be Crocwise Resources*.

Ask students:

> What were the benefits in reintroducing the wolves?

> Why is it important to have a top predator in an ecosystem?

Tell the students: we are going to look at one of our top predators from our local ecosystems, the saltwater crocodile.

While watching the Be Crocwise video clip, look out for and focus the explanation about what happened to this predator in the past, link available at *Be Crocwise Resources*.

Ask students: what almost caused the saltwater crocodile to become extinct? *Hunting for the crocodiles' skins.* Saltwater crocodiles almost disappeared forever! Since hunting stopped in the NT in 1971, crocodiles have been protected. Now their numbers have increased to reach almost the same as before hunting started. **Crocs are common.**

Tell the students they'll look at the saltwater crocodile's relationship with other living things in northern Australian ecosystems. Ask them to think about the impact that not having the saltwater crocodile around might have on the ecosystems.

Discuss with the class:

> Why do animals need to eat plants or other animals in the first place? *Because animals need food energy.*

> Where does this energy first start? *The sun.*

> How does energy get from the sun into our food? *Photosynthesis. In this process, sunlight energy is used by a plant to force carbon dioxide and water molecules together to form sugar. The light energy has been transformed into chemical energy in the plant's cells. If we, or any other animal, eat this plant, we take on this chemical energy/sugar. When we need to use this energy, our bodies break apart the sugar molecule, releasing the energy.*

> What is the name of animals that eat plants? *Herbivore.*

> What is the name of animals that eat other animals? *Carnivore.*

> How could energy move through an ecosystem? *Sunlight reaches Earth, is photosynthesised by plants, is eaten by an animal, which is eaten by another animal.*

Explicit teaching/student demonstration

Explain to students that the way energy moves through a system is the most basic example of how living organisms are connected. We can show how this energy moves through an ecosystem using food chains or webs.

A ***food chain*** shows a direct/straight energy path.

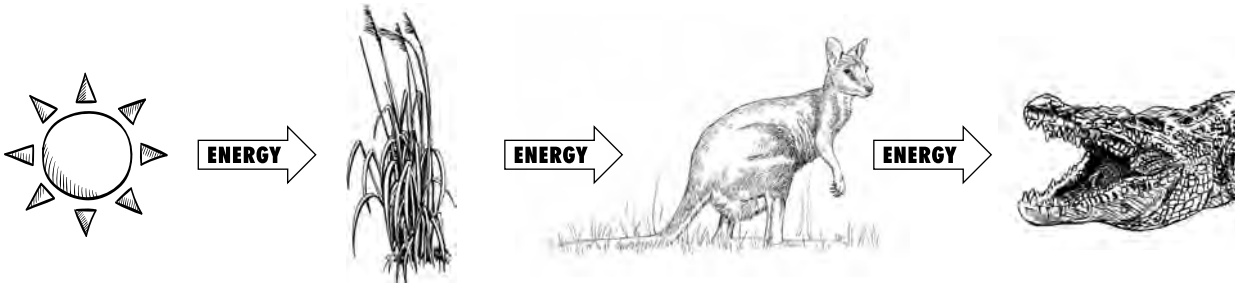
> Choose seven students to demonstrate a simple food chain.
> Give three of the students arrows—they will show the direction that energy is moving.
> Select students to be the sun, a dingo, an agile wallaby and grass.
> Ask the class to rearrange these students to show:
a) the correct order of organisms/living things that the energy would move through
b) the correct direction that the energy flows.
> Once the students are happy with their arrangement, make any corrections.

Individual task

Students write (or discuss) the meaning for 'food chain' in their books using the example they just created as a class.

Display the following images on the whiteboard. Ask students to use these to create another simple food chain. Give these instructions: place the living things (e.g. grass, wallaby, crocodile) in order first, and then add in the arrows show the energy direction.

As a class, check they are correct. Allow time for students to make any corrections. The completed food chain should look like this:



Explicit teaching/class discussion

Discuss with the class: food chains are perfect for demonstrating simple relationships, but are ecosystems normally this 'neat' or simple? Energy does not normally move through an ecosystem in a simple straightforward way. *Living things will often eat more than one thing or will be eaten by more than one animal.* These more complex relationships can be shown by a **food web.** A food web is made by combining food chains to show the relationships between many living things in the same place. Arrows show the energy pathway.

Food web class activity

1. Give every student one of the enlarged organism pictures (printed for students to tape/pin/hang onto themselves) from the 'creating and destroying a food web'. worksheet.

There are 18 images – some students could form pairs if there are more students.

2. Have students form a circle with everyone facing towards each other and displaying their organism.
3. Choose one student to look around and identify which other organisms they would rely on as food. Using the string/flagging tape, join the first student to everyone identified. For instance, the Northern snake-neck turtle feeds on fish, tadpoles, frogs and crustaceans, such as prawns. Repeat the same exercise with all other students.

NB: this may take some time, but it gives everyone an opportunity to participate. Eventually you should end up with everyone holding several pieces of tape and a criss-crossed 'web' of connections in the centre of the circle—a simple, very visual representation of all the links between members of an ecosystem.

IF TIME

4. Add in some external pressures. Take a scenario, such as the one below for salties in 1968, and impose it on the circle. Everyone who is adversely affected should drop his or her ends of the tape. Now those who have been affected by the dropped tape should in turn drop their own tapes, and so on. Pretty much everyone should be affected, signifying the collapse of the food web and therefore the waterway ecosystem.

It's 1968, just before saltwater crocodiles became protected. There are hardly any crocodiles left!

> At first, this looks good for any animal the crocodile eats—they will no longer be a predator! Have the students that have the organism pictures of wallaby, snake, fish, buffalo, pigs, birds, turtles and human cheer. Now there is nothing to stop them building up their numbers!

> But is there enough food? Let's have a look past these organisms to their food sources. They are being eaten! Have these living things drop their ends of the tape.

> What does this mean for the wallaby, snake, fish, buffalo, pigs, birds, turtles and people? They no longer have food, and their numbers will reduce because they will either die or need to move away to find more food. Have them drop their tape.

> What organisms are negatively affected? Have these organisms drop their tape.
> Go down the line until everyone has dropped his or her tape. The ecosystem has collapsed.

Individual task

Students write (or discuss) the meaning of 'food web' in their books.

Introduce the worksheet 'Creating and destroying a food web'. Explain how students are to read the plant and animal descriptions, cut out the images and create a food web on A3 paper, using arrows to show the energy pathways (arrows should point to the organism the energy is moving into, e.g. frog ➞ snake).

For a lower-ability group or with limited time, this activity could be completed in teams.

For a higher-ability group, or with more time, the diet descriptions can be removed, requiring the students to discover these through research.

Reflection questions

> Why do we, and crocodiles, need to eat? Because animals need food for energy.
> What makes a saltwater crocodile so dangerous? *Various answers, including top predator, ambush hunter, adaptive features.*
> How does energy enter and move through a food chain/web? *From the sun, photosynthesised into sugar by plants, passed on to other animals as they eat the plants, and then as these animals are eaten by other animals.*
> How does a food chain/web show energy flow? *Arrows show where the energy moves.*
> Why were crocodiles protected? What makes them so important? *They were almost hunted to extinction. They are a top predator and important in the Top End ecosystems because other living things rely on them.*

Going further

> Look at another food web in an ecosystem that does not include crocodiles. What is the top predator? What similarities and differences are there between these two systems?
> Science teachers: lead into the concept of biomass pyramids by using the food web created in this lesson to discuss how many of each species are necessary (within a given space) for the food chain/web to function. For example, how many grass plants would you need to feed one wallaby? Comparatively, you couldn't have 10 crocodiles all trying to survive from three barramundi. Shade the animals red if there are 1–10 individuals, orange if there are 10–20, and yellow if there are more than 20 individuals.
> Science teachers: further explore the concepts of trophic levels (producer, first-order consumers through to higher-order consumers), energy flow through ecosystems and loss of energy through the food chain:
  - classify the organisms in the food web as producers, first-order consumers, second-order consumers, third-order consumers etc.

LESSON 11 RESOURCES

3 x energy arrows (to be used in both food chain examples)	'Creating and destroying a food web' worksheet
Images for food chain demonstration: > sun > grass > wallaby > crocodile.	

Learning outcomes

Students:

> understand that saltwater **crocs are deadly**

> know that saltwater crocodiles are more aggressive at different times of the year and can explain the reasons for this

> understand dangerous behaviours in crocodile country and suggest safer alternatives for people to **Be Crocwise** and reduce their risk of crocodile attack.

Success criteria

Students have:

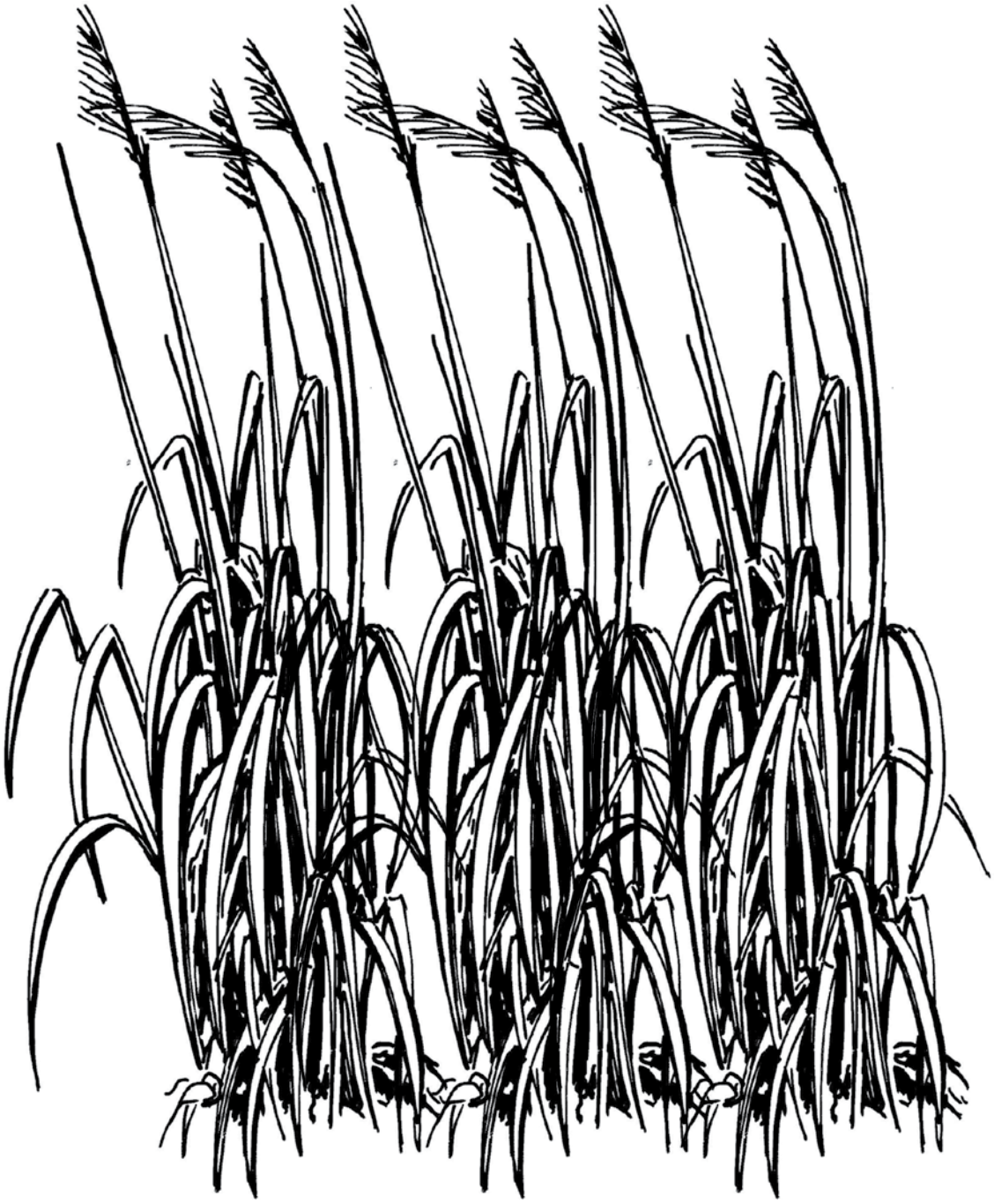
> discussed some adaptations/features that make saltwater crocodiles such successful predators (**crocs are deadly**)

> listed the times of the year saltwater crocodiles are particularly aggressive

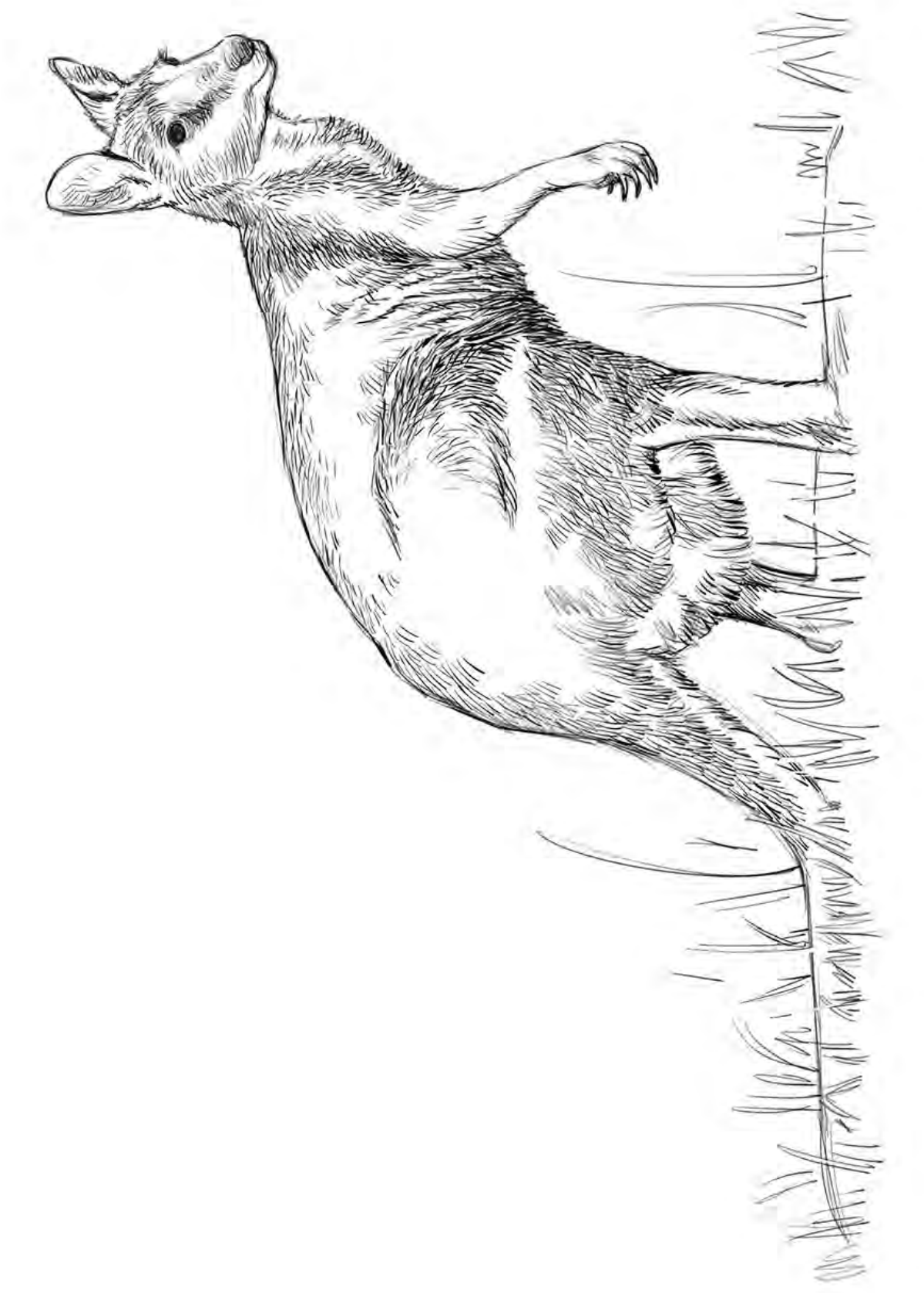
> explained/demonstrated through role-play why crocodiles are more aggressive at these times

> identified alternative, safer behaviours for people living in crocodile country to **Be Crocwise**.

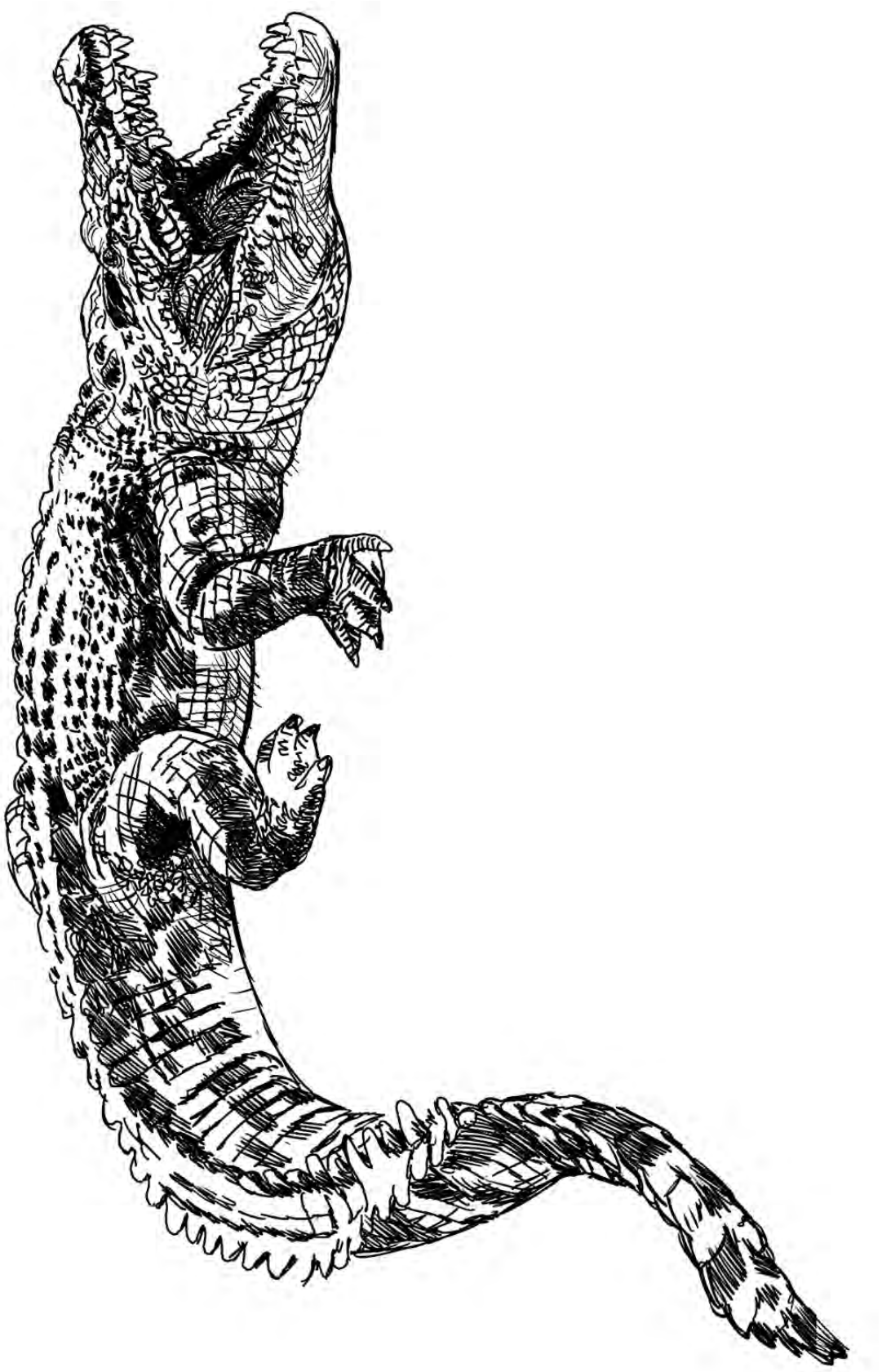
GRASS



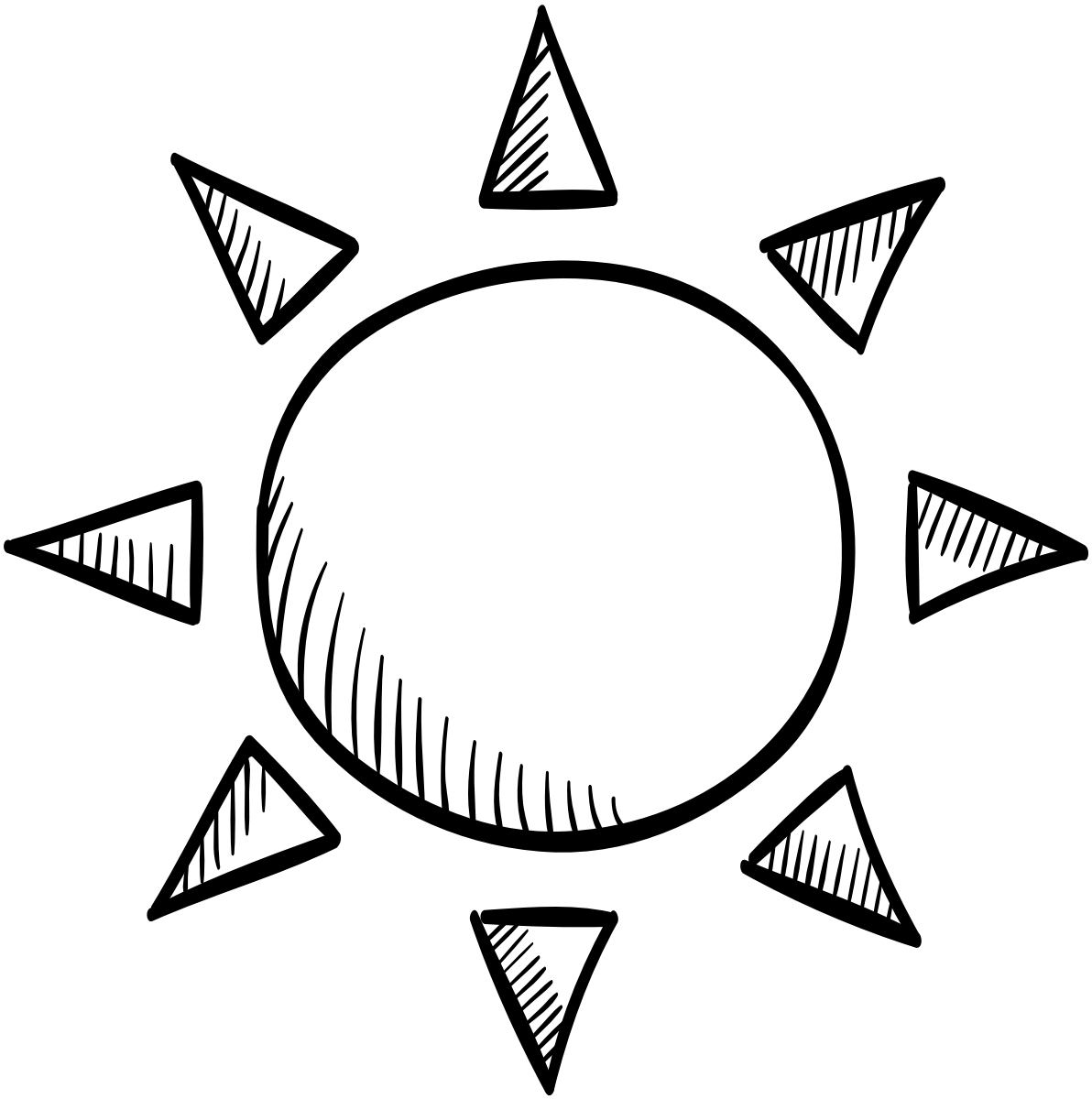
WALLABY



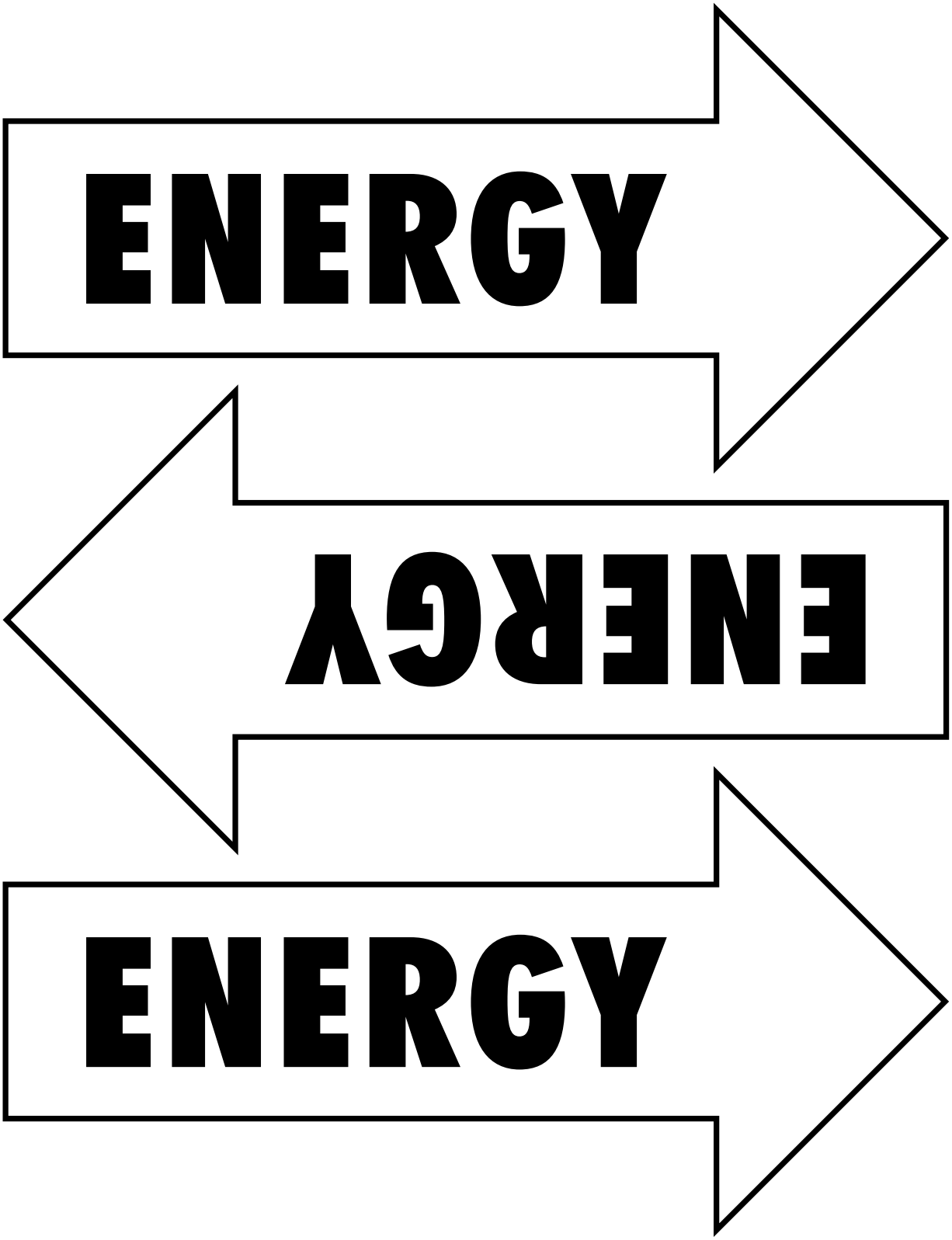
CROCODILE



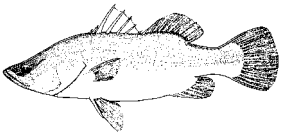
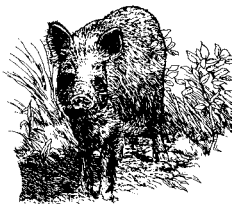
SUN



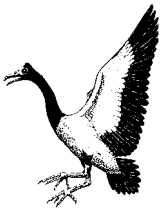
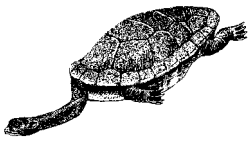
ARROWS



CREATING AND DESTROYING A FOOD WEB

Living Things	Picture	Diet
Agile wallaby *(Macropus agilis)*		Feeds on native grasses, including spear grass, grass roots and some leaves.
Arafura file snake *(Acrochordus arafurae)*		Forages for prey at night and uses body coils to subdue prey. Diet is primarily made up of small fish and crustaceans, e.g. prawns.
Barramundi *(Lates calcarifer)*		Eats a variety of prey, depending on the size. Generally, will eat any smaller fish and prawns.
Feral buffalo *(Bubalus bubalis)*		Feeds on a wide variety of grasses and water plants.
Feral pig *(Sus scrofa)*		Opportunist and finds food by rooting or digging. Diet typically includes roots, grasses, frogs, snakes, eggs of birds and reptiles, and carrion.
Grasshopper *(Order Orthoptera)*		On average, can eat 16 times its own body weight per day. Feeds on vegetation.
Human *(Homo sapiens)*		Both Aboriginal and non-Aboriginal people eat a large variety of food, including wallaby, file snakes, barramundi, buffalo, pig, magpie geese, turtles, prawns, and crocodiles.

Living Things	Picture	Diet
Jabiru *(Ephippiorhynchus asiaticus)*		Wades in shallow water, regularly stabbing and jabbing at prey. Will eat fish, crustaceans and aquatic insects.

Organism	Picture	Diet
Magpie goose *(Anseranas semipalmata)*		Feeds on a variety of aquatic vegetation, with spike-rush forming most of its diet.
Mayfly nymphs *(Order Ephemeroptera)*		Only feed as larvae (nymphs). Will eat dead or living algae from the bottom of the water.
Northern snaked-neck turtle *(Chelodina rugosa)*		Uses its long neck like a snake to strike at passing prey, including fish, tadpoles, frogs and crustaceans.
Plankton and algae		Ranging from microscopic to macroscopic, obtains energy from sunlight to grow.
Rocket frog *(Litoria nasuta)*		Uses sticky tongue to capture terrestrial (land) insects.
Fresh water shrimp *(Class Crustacea)*		Feeds primarily at night, with other crustaceans and aquatic insects making up most of its diet.
Saltwater crocodile *(Crocodylus porosus)*		Excellent predator. Will eat anything it can catch, including wallabies, snakes, fish, buffalo, pigs, birds, turtles and even people.

Organism	Picture	Diet
Seven-spot archer fish *(Toxotes chatareus)*		Shoots water at insects resting on vegetation to knock them into the water. Will also feed on aquatic insects.
Spear grass *(Sorghum spp.)*		Uses its long neck like a snake to strike at passing prey, including fish, tadpoles, frogs and crustaceans.
Spike-rush *(Eleocharis spp.)*		Typically grow around waterways and can be either fully or partly submerged. Provides habitat for many marco-invertebrates, which provide food for fish. Produces energy by photosynthesis.

LESSON 12 – TAKING SIDES

Community Debate

Teacher materials/preparation	Student materials
Whiteboard or similar	Paper/books, pens/pencils for brainstorming, creating arguments
Croc management info statements (3 information groups, one statement per student/pair – depending on your class numbers)	*If time, materials to create viewpoint costumes
'Opinion' and 'fact' labels (each written on a separate A4) + tape/blue-tac to fix them with	
List of 10 Fact and Opinion Statements	
Viewpoint cards	
Masking tape or similar for students to create labels to identify themselves as their stakeholder	
Timer for limiting viewpoint/argument presentations.	

Learning outcomes

Students:

- understand there are many different viewpoints in the community when it comes to crocodile management
- have discussed the different types of crocodile management techniques the Parks and Wildlife do in the NT (and the signs they use for these areas – **look for signs**)
- understand that stakeholders (an individual, group or organisation) will have their own points of view about crocodile management.

Success criteria

Students have:

- been allocated a community stakeholder's viewpoint in response to the statement '*All saltwater crocodiles should be culled*' and brainstormed the strengths and weaknesses of that viewpoint
- discussed background information on the saltwater crocodile's history in Australia and how the croc team works to keep people safe (**crocs are common, crocs are deadly, crocs move around, look for signs**)
- created an argument for their viewpoint and responses to the weaknesses in their argument
- presented/argued their viewpoint to the class
- assessed the presentations of all viewpoints and voted for a debate winner.

Lesson introduction/class discussion

Write the statement '*All saltwater crocodiles should be culled*' on the whiteboard for students to see as they walk in. Ask students what their response is to this statement (*check students' understanding of the word 'culled'*). Try not to lead them to any viewpoint. Ask them why people would argue for this statement and why people would argue against it. Tell them that in this lesson they'll look deeper into these different opinions. They will be given a stakeholder's (*check they understand the meaning of 'stakeholder'*) viewpoint and will argue for that person in a class debate (*check they understand what a debate is*). Their votes will determine the winner of the debate.

Class discussion

Before you hand out the stakeholders' viewpoint cards, there is background information to be discussed so the students have some base knowledge.

Show them the Be Crocwise video, link available at *Be Crocwise Resources*.

Ask the students:

> Why are humans and crocodiles interacting more than they used to?
  - *ANSWER(S): since crocodiles became a protected species in 1971, their numbers have been increasing. Now there is estimated to be 110 000 – 130 000 living in the wild in the Top End.* ***Crocs are common.*** *Similarly, number of people has increased (the Darwin census registered 37 100 people in 1971 and 142 300 in 2015). More people and more crocodiles means a higher chance of them interacting.*

> Why was hunting of crocodiles stopped?
  - *ANSWER: saltwater crocodiles were almost hunted to extinction (fewer than 5000 in all of Australia!)*

> Why are crocodiles a protected species?
  - *ANSWER: to ensure saltwater crocodiles are still around in the future.*

Class activity

Ask students: did you know there's a croc management team and other Parks and Wildlife rangers who work to keep people in the NT safe? Do you know how crocodiles are managed in the NT? Do you know about the different signs that tell you about saltwater crocodiles in an area? **Look for signs.**

There are three different types of crocodile management strategies in the NT: exclusion, no tolerance and removal.

- **Exclusion:** saltwater crocodiles are prevented from entering an area—and any found are removed—so the level of risk is low enough to allow swimming (for example, Wangi Falls in Litchfield National Park).
- **No tolerance:** many traps are placed in an area to remove crocodiles that enter and reduce the risk of attack (for example, Darwin Harbour). In these areas, people can do water-based activities, but swimming isn't encouraged.
- **Removal:** only aggressive crocodiles are taken away; the rest are left alone. This management type is in place in most NT waterways (for example, Fogg Dam Conservation Area).

Crocodile management is explored more deeply in Lesson 10, When to Cage the Croc

Class activity

Next, tell the students they will demonstrate he difference between opinions and facts. Stick the A4 'opinion' label to one wall and the A4 'fact' label to another. Have students move from one to the other depending on how they interpret the '10 Fact and Opinion Statements'. Read these statements out randomly.

Debate activity

Tell the students: as we mentioned at the start of the lesson, there are different types of stakeholders when it comes to managing the saltwater crocodile. Each stakeholder has a different viewpoint/bias depending on how they interact with the environment. For example, a fisherman might feel differently about crocodiles to how a traditional owner does, or a tourism operator does or an environmentalist does. Divide the class into 10 groups, and give each group a viewpoint card. There will also need to be one or two chairpersons, or this could be the teacher's role *(check students understand the role of a chairperson)*.

Tell the students: in this exercise you will conduct a community meeting around the statement *'all saltwater crocodiles should be culled'*. The community meeting is a chance for everyone to have their say and give their persuasive argument. Please note, the opinions on these cards don't necessarily represent the views of everyone in a stakeholder group—they are just ONE example. For instance, not all traditional owners feel the same way. Even if you don't agree with

your stakeholder's viewpoint, you need to come up with arguments for that person. We will do a silent vote at the end of each presentation (thumbs up if they were convincing, thumbs down if they were not, flat hand if unsure). The viewpoint with the most votes (most thumbs up) was the most successful in their argument.

Hand out the viewpoint cards. Allow time for the students to research and prepare their case. Make sure students are clearly labelled with their stakeholder name. If there is time, students could get creative and dress the part.

Variations

Give students a recent newspaper article to provide context or motivation for the community meeting, or make the topic specific to your local area. For example, *'all crocodiles within 50 km of Darwin should be culled'* or *'all crocodiles in the Katherine River should be culled'*.

Other related debate topics could include *'crocodiles should be kept as pets'* or *'a hunting season for crocodiles should be introduced'*. These topics would need different stakeholders to be chosen.

Reflection questions

- Who did the class feel represented their case well? What techniques did they use to achieve this?
- What was the easiest part of creating the arguments for your viewpoint? Did it make a difference if you held the same opinion as your stakeholder?
- What is one thing that surprised you when we discussed the background information on the saltwater crocodile's history in Australia and how the croc management team works to keep people safe?

Going further:

- write a media article covering the debate
- write a letter to the editor or a persuasive opinion piece to a politician around the culling of crocodiles
- research and discuss the commercial uses of crocodiles – pros/cons
- visit a crocodile park or a museum to see the history of crocodiles in the Northern Territory
- debate other relevant ecological topics; for example, traditional hunting, introduced species, water quality, mining or overfishing.

LESSON 12 RESOURCES

Included:

> croc management info statements (3 information groups, one statement per student/pair – depending on your class numbers)

> list of 10 fact or opinions

> viewpoint cards

10 Fact and Opinion Statements

FACT	OPINION
Crocodiles are part of the natural environment. They are meant to be there, and if they were removed, the whole system would be thrown out of balance. If people learn to Be Crocwise, they should be able to live harmoniously with crocodiles.	*There are too many large crocodiles in the wild because they are no longer being controlled. If crocodiles were culled then the skin and meat could be used for commercial purposes. The culling crocodiles will not put the species at risk as there are so many being bred in captivity.*
Crocodiles are an important part of the Aboriginal way of life. There are dreaming stories and songs and dances about crocodiles. Crocodiles also provide a source of income for the community through harvesting crocodiles' eggs for farms.	*Every animal has a right to be there and we (humans) do not have the right to choose which animals live and which don't. Do we then kill all lions in Africa just because they have the potential to harm people?*
Tourism employs and generates income for many people in the NT. One of the major drawcards for tourists in the Top End is to see a saltwater crocodile. If culls were introduced, one of the major attractions would disappear and so would some of our tourists.	*I grew up in Darwin, and I don't think it's safe for people to be around NT waterways anymore because crocodiles are no longer controlled. I want to be able to take my kids swimming where I did as a child. I also want to be able to walk my dog off-leash and let him go swimming wherever he wants.*
The presence of large saltwater crocodiles in popular tourist spots means we are limited in the areas we can take people. The risk from crocodiles also means activities we do in some areas are limited, like canoeing, swimming and tubing.	*I enjoy recreational activities around waterways, like fishing and camping, but I also believe crocodiles are part of the 'great Territory lifestyle'. If a crocodile attacks a human, it's because they are entering the croc's environment—their home—and they are just doing what comes naturally to them.*

FACT	OPINION
Crocodiles have been around since the time of the dinosaurs, but humans almost wiped them out by hunting them for their skins. If crocodile had not been protected, they would be extinct in Australia by now. Yes, there are many saltwater crocodiles today—almost as many as there were before people started commercially hunting them. The population is just getting back to where it was.	*I think we are being controlled by crocodiles instead of us controlling them. I don't like that I can only safely go fishing from a boat, but even that isn't really safe because I've had crocodiles jump at my boat to try to get my fish. Crocodiles are eating all the fish that should be there for people to catch.*

Stakeholders' Viewpoint Cards

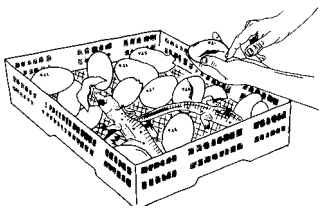
Ranger

'Crocodiles are part of the natural environment. They are meant to be there, and if they were removed, the whole system would be thrown out of balance.

If people learn to Be Crocwise, they should be able to live harmoniously with crocodiles.'

Crocodile farm manager

'There are too many large crocodiles in the wild because they are no longer being controlled. If crocodiles were culled then the skin and meat could be used for commercial purposes. Culling crocodiles will not put the species at risk because there are so many being bred in captivity.'



Traditional owner

'Crocodiles are an important part of the Aboriginal way of life. There are dreaming stories and songs and dances about crocodiles.

Crocodiles also provide a source of income for the community through harvesting crocodile eggs for farms.'

Crocodile tour operator

'Tourism employs and generates income for a large number of people in the NT. One of the major drawcards for tourists in the Top End is to see a saltwater crocodile. If culls were introduced, one of the major attractions would disappear and so would some of our tourists.'

Water sports tour operator

'The presence of large crocodiles in popular tourist spots means we are limited in the areas we can take people. The risk from crocodiles also means activities we do in some areas are limited, like canoeing, swimming and tubing.'

Animal activist

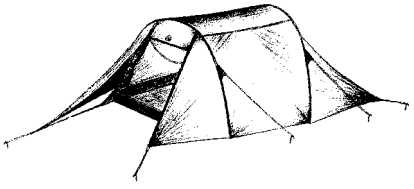
'Every animal has a right to be there, and we (humans) don't have the right to choose which animals live and which don't. Do we then kill all lions in Africa just because they have the potential to harm people?

Resident 1

'I grew up in Darwin, and I don't think it's safe for humans to be around NT waterways anymore because crocodiles are no longer controlled. I want to be able take my kids swimming where I did as a child. I also want to be able to walk my dog off-leash and let him go swimming wherever he wants.'

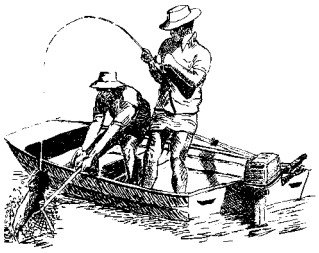
Resident 2

'I enjoy recreational activities around waterways, like fishing and camping, but I also believe crocodiles are part of the 'great Territory lifestyle'. If a crocodile attacks a human, it's just because we are entering their environment—their home—and they are just doing what comes naturally to them.'



Fisherman

'I think we are being controlled by crocodiles instead of us controlling them. I don't like that I can only safely go fishing from a boat, but even that isn't really safe because I've had crocodiles jump at my boat to try to get my fish. Crocodiles are eating all the fish that should be there for people to catch.'



Chairperson (student or teacher)

The role of the chairperson is to keep the meeting flowing, to make sure other participants don't talk over the top of each other and that everyone is given a chance to talk. The chairperson should remain neutral (not take sides).

MIDDLE YEARS ASSIGNMENT 1
(lessons for stage 1 and 2)

RISKY BUSINESS – SPREAD THE WORD!

Please note there are two stages to the assignment and the potential for multiple lessons or a short unit to enable students to be prepared for:

1) assessing risks and risk mitigation

2) reviewing and designing a safety campaign.

STAGE 1: Risky Business

Teacher materials/preparation	Student materials
Ability to project images	Worksheet 'Be Crocwise: safe vs dangerous behaviours'
Internet access	Worksheet 'What's the Risk?'
Examples of dangerous behaviours (when living in crocodile country) from different media sources (e.g. newspaper articles, Parks and Wildlife media releases, Facebook stories)	
Enlarged/electronic copy of 'Be Crocwise: safe vs dangerous behaviours'	
Enlarged/electronic copy of 'What's the Risk?'	
Video: Be Crocwise	

Learning outcomes

Students:

> can assess the risk of a situation and make suggestions to improve safety

> understand methods of communication to target audiences and can themselves communicate a safety message to this audience that relates to least one of the **Be Crocwise** safety messages:
- **crocs are common**
- **crocs are deadly**
- **crocs move around**
- **crocodiles will see you before you see them.**
- **only swim where signs say it's allowed**

Success criteria

Students have:

- discussed the ways people use Top End waterways
- identified risks when given different scenarios
- proposed solutions that would remove or reduce the risk of a specific scenario
- discussed the possible thinking behind people's risky decisions
- identified the types of people who would be at risk from the given scenarios and discussed methods of communicating their proposed solutions to these groups.

Lesson introduction

Show the titles and images from a number of recent saltwater crocodile stories. These could be from the NT News, ABC News or Facebook (including the Parks and Wildlife NT page). Find news and media releases on the Be Crocwise webpage.

Please note that this could create a trigger response in any student or staff member who has witnessed or experienced loss from crocodile attack. Please be sensitive and ask if this may be the case prior to displaying these articles and images.

Discuss with students: we live in crocodile country, but NT people and visitors love to spend time on our waterways. Unfortunately, sometimes people put themselves at risk without even meaning to. By the end of this lesson, we will have come up with some solutions for people so they can 1) keep spending time on our waterways while 2) still staying safe in crocodile country.

Class activity/brainstorm

Brainstorm with the class: we know people love having fun or working around the water. What are some of the ways people use our Top End waterways? Record the responses for later discussion.

Individual/pair/class activity

Introduce the worksheet 'Be Crocwise: safe vs dangerous behaviours'. Lead the students: let's go back to looking at these scenes. Look at the dangerous behaviours scene. Ask students: what is happening here? What are people doing that is putting them at risk?

Think – you have 1 minute to find as many risky behaviours as you can (you can circle or cross them as you go)

Pair – you have 1 minute to share your findings with your neighbour – can you find any extras?

Share – each pair shares one risky behaviour with the class.

Discuss with the class: what are other unsafe ways people behave around waterways. Think about what you have read or seen in the NT News or other media sources.

Here are some other examples to prompt discussion:

- cleaning fish at the water's edge
- walking in the water to launch boats
- standing on a crocodile trap
  - swimming where no signs are present to say it's allowed
- fishing waist deep in water
- walking across creeks
- tying a dog up next to a river
- children playing close to the water's edge
- camping close to the water's edge.

Ask students to look at the worksheet and the 'Be Crocwise: safe behaviours' scene. What are the people doing differently here that is reducing their risk of crocodile attack?

Class discussion/individual task

Discuss with students:

In Australia (and other countries) laws require workplaces to protect people from getting hurt while they're at work. These are known as work health and safety, or WHS, practices. Both the workers and other people in the workplace are responsible for safety. The same thinking goes for places like our national parks, especially in Top End where salties live. The Be Crocwise messages are to help people see the risks of being in crocodile country and change their behaviour to make them safer (reduce the risk).

Introduce the 'what's the risk?' worksheet and highlight the risk assessment chart. Using one of the dangerous behaviours in the Be Crocwise dangerous behaviours scene, model how to use the risk assessment chart and complete the columns 'what's the hazard?', 'what's the risk?' and 'what can we do?' Students should then choose another four dangerous situations and repeat the process.

Example of a completed risk assessment Chart

What's the hazard? *What could hurt you or something else?*	**What's the risk?** *Use the risk assessment table to work out how likely it is that the hazard will hurt someone and how badly they could get hurt.*	**What can we do?** *Suggest ways to control or reduce the chance of the risk happening. E.g. get rid of it, swap something over, separate it, teach people ways to avoid it, use protective equipment.*
Hands dangling over the side of a boat in crocodile country – you could be attacked and pulled into the water by a saltwater crocodile.	***Likelihood:*** unlikely (could happen at some time) OR possible (might happen sometimes). ***Consequence:*** fatality OR major injury ***Risk assessment:*** HIGH	Various suggestions possible: > have a boat with high sides so people can't dangle parts of their body out > make sure people know the risk and to keep their hands inside the boat

Reflection questions

> Why do people love our NT waterways so much? *Refer to the results of the brainstorm.*

> Why can spending time around the water be hazardous? *We share our waterways with the saltwater crocodile.*

> What are some of the risky and dangerous behaviours that happen in crocodile country? *Refer to the Be Crocwise dangerous behaviours on their worksheet.*

> How did we assess how risky these behaviours were? *We used the risk Assessment Chart to compare how likely something was to happen with the consequence if it happened.*

STAGE 2: Spread the Word!

Teacher materials	Student materials
Ability to project images	Worksheet 'safety campaign analysis'
Internet access	Worksheet 'Designing your safety campaign'
Videos: safety campaigns > slip, slop, slap > 'Dumb ways to die' Metro Trains Melbourne's train safety campaign > national tobacco campaign 'every cigarette is doing you damage' > anti-drink driving – RAAD drink driving – Who's your Sober Bob? – NZ Legend Links to all videos can be found at *Be Crocwise Resources*.	***Depending on your students' ability to work independently, a computer lab and headphones could allow students to individually review the safety campaign videos and complete the above worksheet***
Video: Be Crocwise	

Learning outcomes

Students:

> analysed successful public safety campaigns

> investigated the techniques used in public safety campaigns

> selected appropriate target audiences for a chosen Be Crocwise message

> understand methods of communication to target audiences

> can communicate a safety message to this audience that relates to least one of the **Be Crocwise** messages:
- **crocs are common**
- **crocs are deadly**
- **crocs move around**
- **crocodiles will see you before you see them.**
- **only swim where signs say it's allowed**

Success criteria

Students have:

> reviewed public safety campaigns and drawn out common communication themes or 'tricks'
> discussed the ways people use Top End waterways
> discussed the possible thinking behind people's risky decisions
> identified the types of people who would be at risk from the given scenarios (target audience)
> generated targeted methods of communicating their proposed solutions to these groups.

Class discussion

Discuss with students: one of the important parts of any safety or awareness campaign is education. However, not everyone will get the message, or if they do, they won't take enough notice to change their behaviour. Think back to your first brainstorm where we looked at all the things people enjoy doing on our waterways. They're not going to want to stop! What kinds of attitudes lead people to make risky decisions? *Lead the discussion to include risks more likely experienced by a teenager; for example, peer pressure, showing off for a date, impaired judgement from drinking etc.*

At the end of this lesson, you'll design a safety campaign for your own Be Crocwise message.

Brainstorm the following questions with the students:

> How could we get your messages out to the public?
> What can you do to get people's attention?
> What makes a message 'strong' enough (or at least stick in their heads) that people will want to listen to it and then maybe change their behaviour?

Show the Be Crocwise video

Introduce the worksheet 'Safety campaign analysis'. As a class, complete a section.

Example:

CAMPAIGN NAME: **What's the message?**	**Be Crocwise** Be safe in crocodile country, crocs are common, crocs are deadly, crocs move around etc.
Who is the target audience?	People who use social media, who watch TV, teenagers and children, parents (as many groups in the community as possible).
How is the message communicated? What 'tricks' are used to make the message catchy?	Colour, cartoon, catchy song/jingle, clear information in 'everyday' language, easy suggestions to change behaviour.

Small group task

Place the students in small groups (2–4 students). As a class, watch the following safety campaigns. In their groups, students briefly discuss and complete a section on their worksheet for each video. Allow students a set time to complete each section before moving on to the next video.

Links to safety campaign videos available at *Be Crocwise Resources*.

> slip, slop, slap

> 'Dumb ways to die' Metro Trains Melbourne's train safety campaign

> national tobacco campaign 'every cigarette is doing you damage'

> anti-drink driving
  – RAAD drink driving
  – Who's your Sober Bob?
  – NZ Legend

As a class, discuss the group results. Ask the students what they think were the best communication 'tricks' to get a message across. Have them write (or circle) their favourites down on their worksheet. Tell the students that they can use these 'tricks' when designing their own safety campaign for at least one of the Be Crocwise messages.

For any successful campaign, it's important to:

1) set your goals – what do you want to achieve?
   - *keep people safe from the risk of crocodile harm.*
2) find your audience – who are you targeting your message at?
   - *various/individual's choice: teenagers, fishermen, tourists, locals, mothers, kids etc.*
3) choose your communication type – where can your message reach your audience? For example, video, music, posters, a performance or art display.
4) tailor your message to the specific audience – what things make the most impact on your target audience? Why should they take notice of your message? How are you going to hold their attention? How are you going to make it personal to them so they will want to change their behaviour? (and could it be inappropriate for other age groups – how do you ONLY reach your target audience?)
5) can you measure if it's successful? Did they understand your message? What could improve it?

Individual/group activity

Individually or in groups, direct students to select one of their risk assessment scenarios from Stage 1 'Risky Business' and create a public safety/education campaign for their message. Tell students about the Be Crocwise messages used by the Northern Territory Government to educate people on crocodile safety. Introduce the worksheet 'designing your safety campaign' to help scaffold this process.

This simple worksheet can be modified to suit your students' abilities. With the addition of a marking rubric, it can be used as part of the assessment process.

Set a time for students to complete this work. Guide their method of communication so they can meet this timeframe. For example, suggest video as an option if there's time .

Give students the opportunity to share their work with the class and even beyond.

Reflection questions

- Why do safety campaigns have to be attention-grabbing? *To not only attract attention but motivate behaviour change.*
- Why can spending time around the water be hazardous? *We share our waterways with the saltwater crocodile.*
- What kinds of risky, dangerous behaviours is the Be Crocwise campaign hoping to change? *See examples above in this activity of unsafe ways people behave around waterways*
- What were the different ways we could share our safety message? *Various, depending on the class.*

Going further:

- Research the ways the saltwater crocodile is managed in the Northern Territory.
- In teams, produce a 30-second TV commercial about crocodile safety. Critique the commercials in a format similar to *The Pitch* a segment on the ABC's 'The Gruen Transfer'.

(NB: search YouTube for examples of these segments, but very few may be appropriate for middle years viewing).

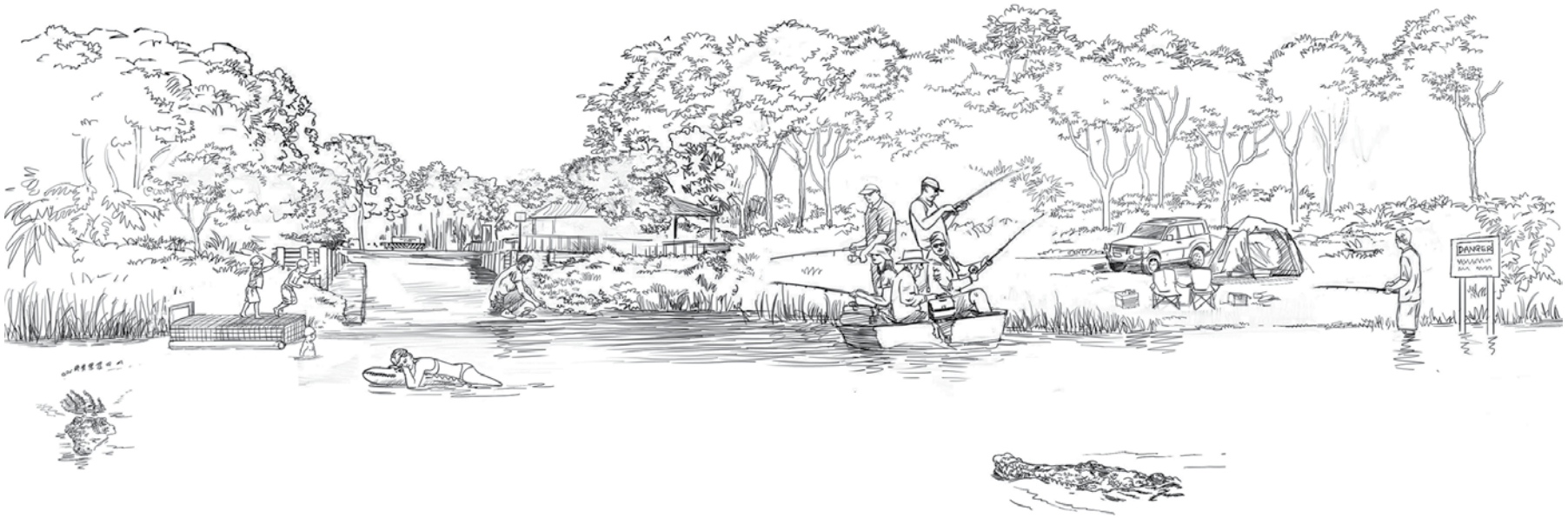
- Explore behaviour change strategies used now and in the past (e.g. smoking, drinking, speeding). Have they been successful?
- Explore how the media persuades people to change their behaviour. What does/doesn't work?
- Choose a magazine, journal or newspaper to write an article about behaviour around crocodiles. The story can either be factual or fictional. Take photos to support the story.

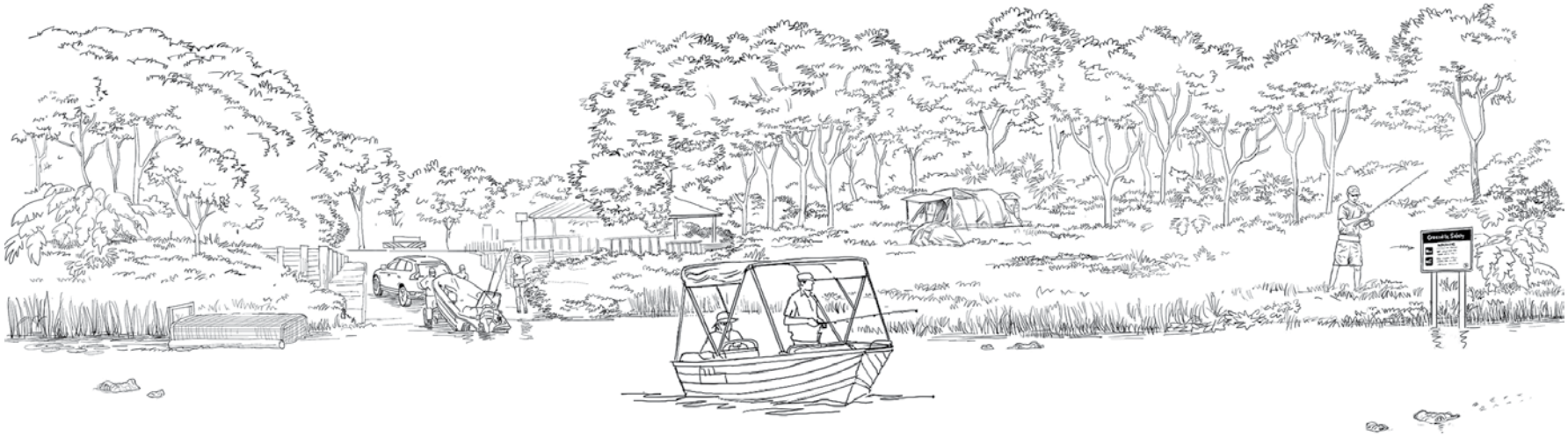
ASSIGNMENT 1 RESOURCES
(stage 1 and 2)

Stage 1 'Risky Business'

> Worksheet 'Be Crocwise – dangerous vs safe behaviours'
> Worksheet 'What's the risk?'

Be Crocwise – dangerous vs safe behaviours





What's the Risk? Living in crocodile country.

Risk assessments are very important. Every workplace in Australia is required, by law, to have plans in place to keep its workers and any visitors safe and healthy. These plans help to:

1) identify and create awareness of a hazard or risk
2) assess the risk – how dangerous is it?
3) identify ways to get rid of the hazard or ways to reduce the risk, preventing any injuries or death.

Risk assessment Chart

	Likelihood				
Consequence	**Very likely** *Expected to happen most of the time*	**Likely** *Will probably happen most of the time*	**Possible** *Might happen sometimes*	**Unlikely** *Could happen at some time*	**Highly unlikely** *May happen only in exceptional circumstances*
Fatality	Extreme	High	High	High	Medium
Major injury	High	High	High	Medium	Medium
Minor injury	High	Medium	Medium	Medium	Medium
First aid	Medium	Medium	Medium	Low	Low
No treatment needed	Medium	Medium	Low	Low	Low

People love living and visiting the waterways in the Northern Territory. Sometimes people are so caught up in their fun activities that they forget they are living in the same country as the saltwater crocodile. **Crocs are common.** *Many* crocodiles live in crocodile country—in fact, there is almost one crocodile for every person who lives in Darwin!

Choose 5 different scenarios that could be seen along NT waterways, and use this Risk Assessment Table to work out how 'risky' the decisions really are.

What's the hazard? *What could hurt you or something else?*	**What's the risk?** *Use the risk assessment table to work out how likely it is that the hazard will hurt someone, and how badly they could get hurt.*	**What can we do?** *Suggest ways to control or reduce the chance of the risk happening. E.g. get rid of it, swap something over, separate it, teach people ways to avoid it, use protective equipment.*

ASSIGNMENT 1 RESOURCES
(stage 1 and 2)

Stage 2 'Spread the Word!'

> Worksheet 'Safety campaign analysis'
> Worksheet 'Find your target audience'

CAMPAIGN NAME **What's the message?**	
Who is the target audience?	
How is the message communicated? *E.g. what 'tricks' are being used to make it attractive?*	

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What do you think are the best communication 'tricks' YOU could use?

Circle your favourites.

Designing your Be Crocwise safety campaign

1. **What is your Be Crocwise message?**

2. **Set your goals – what do you want to achieve?**

3. **Who is your target audience?**

Age range	
Gender	
What do they like to do with their time?	
What things are they interested in?	
Where do they live?	
Anything else that might be useful?	

4. **What's the best way to reach your audience? How are you going to communicate your message?**

5. Tailor your message to the specific audience

What things make the most impact on your target audience?

Why should they take notice of your message?

How are you going to hold their attention?

How are you going to make it personal to them so they will want to change their behaviour?

6. What can you do to measure if your campaign is successful?

Did they understand your message? Did anything turn them off watching it?
What could improve it?

BE CROCWISE

Teaching and Learning Resource Kit

Parks, Wildlife and Heritage
Department of Tourism and Culture
PO Box 1448, DARWIN NT 0800

To provide feedback on the Be Crocwise Teaching and Learning Resource Kit, contact the Parks and Wildlife Community Engagement Unit:

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