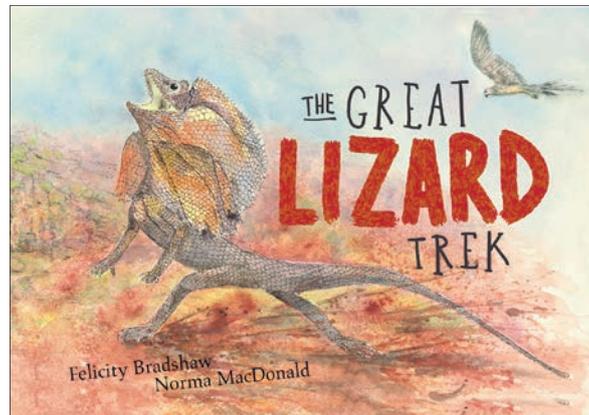


TEACHER NOTES



THE GREAT LIZARD TREK

Felicity Bradshaw (Author) and
Norma MacDonald (Illustrator)

About the book

Trek through country with Rocky and his lizard relatives in search of a cooler habitat.

Rocky, an ornate dragon, lives on granite rocks in the south-west of Australia. But further north, where it is getting hotter and wetter, his desert relatives are having trouble with their eggs. As the lizards trek through country in search of a new home, Rocky shares local Indigenous and Western understanding of these changing environments and the animals that live in them.

Written by Felicity Bradshaw, a retired Research Officer at University of Western Australia, and illustrated by Norma MacDonald, an Aboriginal Yamatji artist, *The Great Lizard Trek* will delight, entertain and inform primary aged children.

These Teacher Notes were written by Dianne Gordon.



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About these notes

Rocky is an Ornate Dragon (*Ctenophorus ornatus*) who introduces us to his cousins, their personalities, adaptations and their country. He talks to us with warmth and humour and tells us about some trouble that they are all experiencing: the climate changing to become hotter and wetter and how this impacts on the lizards' lives. We follow the lizards as they head south to cooler temperatures and less rain. In this story, the lizards' response to the pressure of climate change is to migrate.

These notes offer suggested questions as a springboard for inquiry-based learning. They can be used to prompt further inquiry in discussions and, in conjunction with student questions, to frame research and contribute to positive action.

The Australian Curriculum links conclude the notes.



Dreaming

1. Students on country may be fortunate enough to have local knowledge of their lizards.
 - Families and local elders could be approached to accompany teachers and students on a field trip to research the habitat, lifecycle, diet, behaviour and tracks.
 - Student groups could present their findings to the local community in a project presentation using information logs, photo exhibition, PowerPoint, paintings, songs and dance.
2. Find out if there are any Dreaming stories that can be shared about any lizards.
 - How do the stories describe the lizards?
 - Do they tell us how they came into being?
 - What do they tell us about their personalities and adventures?
 - Are there any dances, songs or paintings of the lizards?

Adaptations for Survival

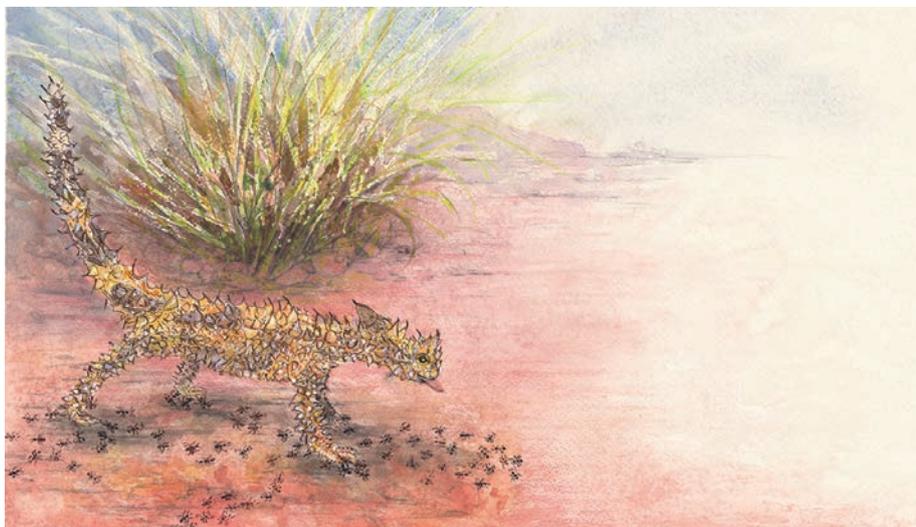
1. Turn each character we meet in *The Great Lizard Trek* into a local celebrity.
 - For each group of students, compile a media pack for one animal: the Olive Python; the Gecko; the Crow; the Water-holding Frog; or a lizard of their choice. In the pack, include their Aboriginal name, all their other names, photo, map, habitat, diet, where they have their babies and any Weird and Wonderful facts.

2. Why does Goanna's wife lay her eggs inside a termite mound?
 - Design and build a papier mâché termite mound with the students, finding out along the way, how to position it to maximise protection for the termites from the heat.
 - The 'chimney' of the constructed termite mound could also double as a post box for questions that arise as the students further their study.
3. Mammals, birds and a few fish are the only 'warm-blooded' animals on the planet. We eat many times a day and our food is quickly broken down to produce energy and a fairly constant internal body temperature. 'Endothermic' is the word that better describes how our bodies manage to maintain their temperature. 'Endo' means inside: our temperature regulation is managed from within our bodies.

All other animals are often called 'cold-blooded', but this is a misnomer. They become warm-blooded when they have access to heat. As a result, they are best called 'ectothermic', 'ecto' meaning outside. Reptiles regulate their body temperature, which is often much the same as ours, by their behaviour. When warming, they bask in the sun and position their body in relation to the angle of the sun's rays. In the middle of the day, for example, you might see a lizard almost upright, with only the top of its head receiving the direct rays of the sun. They can cool down by staying underground, or 'stilt' like Rocky. Some lizards, like Sandy, can change colour.

As a result of being cool during the night-time, the amount of food they require is much less than that of an endotherm.

- How do each of the lizards stay cool in the heat?
 - When Sandy turns pale, how does that help to keep him cool?
4. Where does Moloch store his fat?
 5. How can Moloch drink water from between his scales?
 6. Look carefully at the toes of the lizards.
 - Which ones are tree climbers? Which ones prefer to live on the ground?
 - How are the toes different?
 7. What do *Yoorn* do when they are frightened?
 8. How can Ta-ta run on water?
 - Check out this clip of the South American Basilisk running on water. It will help you to imagine the Ta-ta's technique! <https://www.youtube.com/watch?v=CW0TijmAUqY>
 9. How does Rocky hide on the big granite boulders?
 10. What does Chlamy do to protect herself?



The Struggle to Survive

Aboriginal and Torres Strait Islander peoples have lived sustainably in Australia for at least 50 000 years. Climate change is a relatively recent phenomenon resulting from unsustainable environmental practices that have begun to have a devastating and far-reaching impact on planet Earth.

There is a large, and increasing, number of scientific reports of invertebrates, fish, reptiles and birds migrating in response to the effects of global warming.

Animals for whom migrating is a regular feature of their lives are changing their migration times.

A change in this timing influences when food is available and may cause a mis-match between its availability and when the migrating species arrives at their destination or hatchlings emerge.

It can also place pressure on animals to change their breeding times, alter their lifespan and change the biodiversity balance of the local and global ecosystems. Some animals will be able to adapt more quickly to environmental changes than others, but for most, there will be a struggle to survive.



1. Once all the lizards in the story have moved to Rocky's home in Noongar country, he says that there's plenty for all of them to eat. Animals need food, water, shelter and their own particular conditions to survive.
 - If all the lizards migrated south, which places in Noongar country would be sought after real estate for each of them?
 - Could competition for anything else arise?

Among reptiles, crocodiles, tortoises, geckos and dragon lizards have temperature-dependent sex determination (TDSD). This means that at certain times during the development of the embryo inside the egg, the sex of the young will depend on the incubation temperature. In some dragon lizards, for example, if the incubating temperature is higher than 32°C, the young are born as female. This may not be the same for all the reptiles.

- If TDSD occurs in Goanna's family, what might happen to Goanna populations if climate change results in consistently higher temperatures during the time of egg incubation? Consider that some turtles are actually laying their clutches of eggs earlier in the year to escape the heat and ensure males are emerging!
2. Using the map inside the book's front cover as a guide, make a wall or floor map. Using models or drawings, place the different characters on the map in their original habitat.
 - This could be extended into a board game, with a roll of the die to indicate the number of kilometres the lizards need to travel south in a day. Students could suggest rules for the game. Character cards could have the Aboriginal name on the back; students could suggest bonus cards along the way for landing on sustainable behaviours, or moving back a few squares for landing on unsustainable actions linked to climate change.

Climate Change and Greenhouse Gases

Human activities over the last century have been responsible for the increase in production of greenhouse gases such as carbon dioxide and methane. Greenhouse gases blanket Earth and prevent heat escaping.

Methane is less prevalent in the atmosphere than carbon dioxide, however it is 25% more potent at blanketing our planet.

1. As food waste breaks down in landfill, methane is produced.
 - Students can help reduce their contribution to the greenhouse gas effect by ensuring that they always compost their food waste to reduce the amount going to landfill. This is a simple action with a profoundly positive effect on the environment. For a one page, clear explanation of the causes of climate change, go to: <https://climate.nasa.gov/causes/>
2. Fossil fuel combustion and biomass burning produce nitrous oxide and carbon dioxide. Walking and bike riding reduce our use of fossil fuel combustion. Burning off in the backyard and unnecessarily burning the bush increase the load of these gases in the atmosphere.
 - Walk or Ride to school days could be held more frequently.
 - Ban the incinerator and report bushfires.
 - Organise Caring for Country get togethers with the local community to listen to ideas and form plans for improving the health of our natural environment.
3. Find out about conservation organisations and how they care for lizards in their habitat.
 - The Australian Wildlife Conservancy (<http://www.australianwildlife.org/about/about.aspx>) has several sanctuaries that are natural homes for the lizards in this book.
 - Kanyana Wildlife Rehabilitation Centre (<https://www.kyanawildlife.org.au/>) contributes to animal welfare in Western Australia, through rescue, rehabilitation, breeding, research, training and education programs.
 - Zoos across Australia work with other conservation organisations to protect habitat and contribute to breeding and release programs.



Australian Curriculum

The cross-curriculum priorities of Aboriginal and Torres Strait Islander Histories and Culture and Sustainability walk together throughout *The Great Lizard Trek*.

By examining the science of climate change and enacting the respect and care for the land shown by the Aboriginal and Torres Strait Islander peoples, we may be able to find solutions together to benefit our planet.

Specific content descriptions within the learning areas of Science and Humanities and Social Sciences, are tabled below, with the links leading to the Elaborations.

Content Descriptions for Science

Year 2	Year 3	Year 4	Year 5	Year 6
<p>Living things grow, change and have offspring similar to themselves (ACSSU030 - Scootle)</p> <p>People use science in their daily lives, including when caring for their environment and living things (ACSHE035 - Scootle) </p> <p>Participate in guided investigations to explore and answer questions (AC SIS038 - Scootle)</p> <p>Represent and communicate observations and ideas in a variety of ways (AC SIS042 - Scootle)</p>	<p>People use science in their daily lives, including when caring for their environment and living things (ACSHE022 - Scootle) </p> <p>Science knowledge helps people to understand the effect of their actions (ACSHE051 - Scootle)</p>	<p>Living things have life cycles (ACSSU072 - Scootle)</p> <p>Living things depend on each other and the environment to survive (ACSSU073 - Scootle)</p> <p>Science knowledge helps people to understand the effect of their actions (ACSHE062 - Scootle)</p>	<p>Living things have structural features and adaptations that help them to survive in their environment (ACSSU043 - Scootle)</p> <p>Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083 - Scootle) </p>	<p>Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083 - Scootle)</p> <p>Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE100 - Scootle) </p>



<https://australiancurriculum.edu.au/f-10-curriculum/cross-curriculum-priorities/sustainability/>



<https://www.australiancurriculum.edu.au/f-10-curriculum/cross-curriculum-priorities/aboriginal-and-torres-strait-islander-histories-and-cultures/>

Content Descriptions for Humanities and Social Sciences

Year 2	Year 3	Year 4	Year 5
<p>Interpret data and information displayed in pictures and texts and on maps (ACHASSI040 - Scootle)</p> <p>Reflect on learning to propose how to care for places and sites that are important or significant (ACHASSI042 - Scootle) </p> <p>Present narratives, information and findings in oral, graphic and written forms using simple terms to denote the passing of time and to describe direction and location (ACHASSI043 - Scootle)</p> <p>The idea that places are parts of Earth's surface that have been named by people, and how places can be defined at a variety of scales (ACHASSK048 - Scootle)</p> <p>The ways in which Aboriginal and Torres Strait Islander Peoples maintain special connections to particular Country/ Place (ACHASSK049 - Scootle) </p>	<p>Interpret data and information displayed in different formats, to identify and describe distributions and simple patterns (ACHASSI057 - Scootle)</p> <p>The importance of Country/Place to Aboriginal and/or Torres Strait Islander Peoples who belong to a local area (ACHASSK062 - Scootle) </p> <p>The representation of Australia as states and territories and as Countries/Places of Aboriginal and Torres Strait Islander Peoples; and major places in Australia, both natural and human (ACHASSK066 - Scootle) </p>	<p>Interpret data and information displayed in different formats, to identify and describe distributions and simple patterns (ACHASSI078 - Scootle) </p> <p>The representation of Australia as states and territories and as Countries/Places of Aboriginal and Torres Strait Islander Peoples; and major places in Australia, both natural and human (ACHASSK066 - Scootle) </p> <p>The importance of environments, including natural vegetation, to animals and people (ACHASSK088 - Scootle) </p> <p>The custodial responsibility Aboriginal and Torres Strait Islander Peoples have for Country/ Place, and how this influences views about sustainability (ACHASSK089 - Scootle)  </p> <p>The use and management of natural resources and waste, and the different views on how to do this sustainably (ACHASSK090 - Scootle) </p>	<p>The influence of people, including Aboriginal and Torres Strait Islander Peoples, on the environmental characteristics of Australian places (ACHASSK112 - Scootle)  </p> <p>The environmental and human influences on the location and characteristics of a place and the management of spaces within them (ACHASSK113 - Scootle) </p>