

Aussie
STEM Stars

SKYE BLACKBURN-LANG

Eating bugs for the planet

Story by Dianne Wolfer

Teacher Notes

written by

Vanessa Ryan-Rendall

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ABOUT THE SERIES

Aussie STEM Stars is a fresh and unique series for children and young teens aged 9–13 years that focuses on our Australian STEM heroes. Each book is written by an award-winning children’s author and follows the real-life stories of Australia’s top scientists and inventors, chosen on the basis of their pioneering work. Themes explored in the series include childhood, school, family and formative experiences, what inspired them to pursue their chosen path, how they persevered in the face of challenges and what they have contributed to science in Australia.

Reason for studying this book

Wild Dingo Press publisher Catherine Lewis is excited about their publication. “These disciplines are more important than ever as we look to our inventors and innovators to solve contemporary problems facing humanity and the planet. Our Aussie STEM Stars series uses narrative non-fiction as a tool for educating children – making it as fun and interesting as fiction books. Our writers are passionate about doing justice to their chosen subjects – and their lives – providing teachers, parents and librarians a wonderful series aimed at encouraging children to develop an interest in STEM at a young age.”

About the author

Dianne Wolfer grew up in outer Melbourne, where she watched caterpillars in her treehouses and imagined she was Silky from *The Magic Faraway Tree*. Like Skye, she loved gazing at wildlife illustrations in books. When she was ten, Dianne’s family moved to Bangkok. After high school she studied in Melbourne before backpacking through Asia and teaching children in remote western Nepal.

Dianne’s award-winning books have been published in China, Japan, Poland, USA and made into stage plays. She is a bookworm who reads every day. She especially loves animal stories and spent five years researching her favourite word, anthropomorphism (for her PhD). Inspiring kindness and imaginative thinking is Dianne’s life work.

About our STEM Star: Skye Blackburn-Lang

From the time she was tiny, Skye was fascinated with all living creatures, especially the spiders, butterflies and other insects in the bushland she grew up nearby. From the age of four, she knew she wanted to be an entomologist. Following her dream, she studied bug science as well as food science at university. Combining these two, along with her entrepreneurial talent and dedication to sustainable food production, she became Australia’s first farmer of edible insects, producing eco-friendly and delicious products.

OUTCOMES

Australian Curriculum

KEY FOCUS AREAS

Literacy Stage 2–4

Science Stages 2–4

OUTCOMES

NSW Curriculum

KEY FOCUS AREAS

Literacy Stages 3–4

Science Stages 3–4

BEFORE YOU BEGIN READING THIS BOOK

Front cover

- What do you know about Skye Blackburn-Lang?
- What do you know about eating bugs?
- What do you think when you read the words ‘eating bugs for the planet?’

Back Cover

- Read the blurb. What can you gather about this book from the blurb?
- Why do we need blurbs for all types of books?

Before you start reading

- Highlight the quote on **page v** in the book:

*To my wonderful friends and family, who have always been supportive
and let me be as unique as I want to be.*

— Skye Blackburn-Lang

Write this quote on a poster as a class or small group. Ask students to write ideas around the quote as to what it might mean to them. Add to this poster as the book is studied.

- Outline the glossary at the back and how to use it.
- Who is the author of this book? Explore other books and pieces of writing Dianne Wolfer has written and discuss why she may have been asked to write this book.
- What is the difference between a biography and an autobiography? Explore what this book is and why it is a biography and not an autobiography. Discuss the importance of the STEM Stars series.
- What is narrative non-fiction? Could this book fit into that genre as well?

KEY PROJECTS

Key project 1: Some people say they can't stand insects, while others say they can't live without them.

- Choose at least two insects to show how some annoy us, scare us or harm us yet we need them for survival. Include details such as habitat, diet, location and life cycle to add more detail to your response.

Key project 2: Food science

- What is food science and how does it help society?
- How does studying food help us to eat better, farm better and package our food in ways that not only help the food to last longer but also to cause little impact on the environment?
- Choose a company that creates food that is good for the environment and our bodies. Explain why you have chosen this company as a case study.

Key project 3: Creative writing

- Gather information about how people feel about eating edible bugs.
- Use a survey to find out how people you know feel about edible bugs and what would help them to eat them.
- From this information, **Write a persuasive letter to your school canteen outlining why you need to have edible insect products on the menu, using the information from the survey responses.** Devise the letter so it is not only *persuasive* but also *educational* for the canteen people as well as the students at your school.
- Then think big: create **an advertisement to convince people to eat edible insects.** Use the survey data to help your campaign along with information from Skye's educational resources and talks in your campaign.

Key project 4: Why did we stop?

- Cultures around the world have been eating bugs for thousands of years.
- Why did many modern-day societies stop eating bugs?
- What made us think that eating bugs was a bad thing to do?
- Find some recipes from Australia and around the world that include edible bugs native where they are eaten. How do people catch these bugs and use them?
- How are chefs including edible bugs on their menus?

Key project 5: Reflection on literature

Students can fill in this table as they read to record their ideas and feelings:

Chapter	
In one sentence, explain what this chapter was about?	
What did Skye Blackburn-Lang do and say in this chapter? How did she feel?	
What real life events occurred? Link some dates and extra details to this event.	
How has the author made you feel? Think of the language used to create tension, happiness, wonder, anxiety.	
What new vocabulary have you learnt in this chapter?	

Reflect on this table after the book has been read

- How did your knowledge change throughout the book?
- How did your feelings change?
- Did how you see the characters change as you learnt more about them?
- Has reading this story changed how you feel towards spiders, cockroaches or other insects that people often find scary or unpleasant?
- Choose an insect that you might not like, such as flies or mosquitoes, and find out what would happen if we were able to eradicate them.
- What new vocabulary have you learned in this book?

TEACHING AND LEARNING ACTIVITIES

Chapter 1

- How does the quote at the beginning of this chapter start to help you understand the type of person Skye is?
- Use a map to find out where Port Macquarie and Kooloonbung Creek are.
- What are Melaleuca trees? Find an image of these and their connection to wetlands.
- List the various animals that Skye sees as she walks through the wetlands. Write a description of two of these animals, using the description of the water bearded dragon to help you. Find out what they eat and other interesting facts about them.
- Draw what you think an arachnid fairyland would look like.
- What is a 'smack of jellyfish'? What other collective nouns are there for animals that Skye might use on her wetland adventures?
- How did Skye's parents play a role in fostering her interest in insects?
- Listen to the songs that Skye liked to dance to as a child. Why do you think she enjoyed these songs?

Chapter 2

- 'Goliath beetles can lift 850 times their own body weight!' Why do you think this fact has been included at the start of this chapter? What did you think when you read that? Research the Olympic weightlifters to see how many children of your weight they could lift in one go.
- Find where Oatley Park is and how far away it is from the Sydney CBD.
- Skye liked to compare crabs to her bugs at home. Choose a bug to compare to a crab and find some similarities and differences between them. Do they have common ancestors?
- Why do you think Skye's skin tingled when she encountered insects as a child?
- What does brittle mean?
- Find out more information about the bugs mentioned in this chapter. What do they have in common? How are they different? What 'job' do they do in our environment that makes them an important part of our ecology?

Chapter 3

- How does the title of this chapter make you feel?
- If Skye's teachers weren't happy for her to have jars of bugs on her desk, how might Skye's life be different now?
- What is beachcombing? Do you think you would enjoy doing it?
- How can a beach be like a natural history museum?
- We read stories of Skye caring for two very different animals – the turtle and the water bug. Choose one of these stories and rewrite it from Skye's perspective, imagining she is writing a letter to one of her grandmothers and telling them about her pets.

Chapter 4

- How did Skye encourage students to help her find insects?
- What did Skye compare the praying mantis to? Find an image of a praying mantis and see if you agree.
- The term 'with a bang' is used in this chapter. What does this mean? Write another sentence to show how it could be used in another context.
- **Big task:** Create your own experiment, using ideas from this book and other science books so you can find out more about gravity, air pressure and surface area. Write the experiment out and give it a go.
- What is a polychaete worm?
- Who are David Attenborough, Steve Irwin and Harry Butler? Why does Skye look up to these people?
- This sentence: *'Hey, look,' she called to her family, excitedly. 'We have baby cockroaches!'* makes sense in this biography, but how could it sound different in another context? Why?
- How can a circular food system help us tackle climate change?
- What does the word 'innovative' mean?

Chapter 5

- How do you feel about tarantulas? Describe what it is about tarantulas that makes you feel the way you do.
- Why is the name 'Fluffy' an obvious name for the tarantula?
- Find out what 'innate' means and use it in another sentence. Try to relate it to an insect if you can.

- What does the word 'moulting' mean? Which other animals moult? They can be on land or in water.
- Using maps and timetables, work out how long it would have taken Skye to travel to Taronga Zoo from where she was living at the time.
- Where is Lady Musgrave Island?
- In ways did the excursion to Musgrave Island open a whole new window to Skye?
- Have you been to this island or somewhere similar? If so, what wildlife did you observe? What was your favourite, and why?

Chapter 6

- What does the word 'genteel' mean? Why do you think Skye's grandmother thought the wildlife in Australia is not as 'genteel' as the wildlife in Britain where she was brought up?
- How do you feel about lollipops with edible bugs inside? Would you eat one? If not, why not?
- Do some research on bees and list some facts that you find fascinating about them. What is the name of the mite that has been attacking beehives in other parts of the world. Why are Australian apiarists and farmers afraid of it coming into Australia? How would a mite invasion affect all Australians?
- What does the word 'monotony' mean?
- Where else do you think the role of 'sensory evaluation' might be part of a job?
- Why do you think Skye's favourite moment at university was presenting a lecture?
- How can writing be a 'nemesis'. Do you have something that you have to do that is your 'nemesis'?

Chapter 7

- Did you know or think cats could get diabetes? Why or why not? What causes diabetes?
- What would 'analytical testing' look like in Skye's job? Where else might 'analytical testing' take place?
- What did Lloyd do to ensure Skye stayed longer at the fish shop? Why do you think he did this?
- List all of the new skills Skye learnt by working on the cat food project.
- What are nutritional requirements? What are children's nutritional requirements compared to cats?
- What does 'organic' mean when it is applied to food? Why is this important to Skye?

Chapter 8

- Locate the Wet Tropics World Heritage Rainforest in Australia. Explore why it has been listed as World Heritage.
- What is a gondola? Why would you travel somewhere in one of these?
- Why do you think the author included a labelled image of the butterfly?
- If you were to go to this butterfly farm with your family, what would you recommend them to wear or do so that butterflies landed on them (or not land on them)?
- What do you think about Skye's business? How might you use it?
- What are the stages of a butterfly's life cycle? What is another word for 'cocoon'?

Chapter 9

- If you could purchase one of Skye's kits – which one do you think you would choose?
- What is an entrepreneur? Can you name some famous Australian entrepreneurs who studied STEM courses at university?
- What is a practical session? Why do you think practical sessions are important to learning?
- How does Skye convince people that insects are good pets? How would you convince your family that you wanted to keep one of those pets that they might be afraid of (like spiders or snakes) or think are perhaps not clean (like cockroaches or rats)? What language and examples does Skye give that could be useful?
- Find out about National Science Week in your city and what you can do. Check out Street Science who do fun things throughout the year but especially during Science Week: www.streetscience.com.au
- After reading this chapter, how important do you think education is about insects or other unusual topics before we make judgements? Give examples.

Chapter 10

- Where is Thailand? How long would it take you to fly there?
- Look up the word 'entomophagy' – what does it mean? What does the prefix 'ento' mean?
- Write a list of the different insects Skye and Lloyd tried and what they experienced when they tasted them.
- Do you micro-farm? Could you have a micro-farm at your house or school? How could this be done well?

- What is a commercial kitchen?
- Why are insects an eco-friendly alternative for farming in Australia?

Chapter 11

- What is the 'Ick Factor'?
- Find a recipe to make lollipops – which recipe worked best for you?
- What is biodegradable cellophane?
- What nutrition did Skye discover was in bugs?
- List some different ways Skye and Lloyd are helping the environment with their bug farming.
- Visit the website – Circle harvest and take a look at the different products and recipes on their Youtube channel. Which recipe or product would you like to try first and why?
- Why might Skye have been called 'a bug evangelist'?
- Are there other companies that are also producing edible insect product in Australia?

Chapter 12

- What is a patent?
- Skye tells the Shark Tank that in 2050 the world's population will be nine billion. Is this still the predicted world population? What is the population of the world currently? Which countries have the highest populations? And what are their populations?
- After you have read about the episode, watch the Shark Tank episode: Super Insect Edibles Blow The Sharks Away | Shark Tank AUS. How do you feel about what was offered and what Skye did? Take a look at the comment written by Skye (first comment in the comments section) to find out what happened next.
- Compare what Dianne Wolfer wrote about the Shark Tank episode to what you viewed on the YouTube episode. What did Dianne choose to write about? What did she leave out? Is there anything you think should have been added or taken away from the story in this chapter?
- What is a mentor?

Chapter 13

- What is an agribusiness?
- Imagine you were in the audience at one of Skye's cooking shows. Write down your initial thoughts and then your final thoughts after you have listened and watched her cook and talk about edible bugs. (Sydney Royal Easter Show - Cooking with Cricket Protein)
- Why does the company name 'Circle Harvest' say it all?
- What does 'sidled over' mean?
- Why do you think Circle Harvest's corn chips are a successful product?
- What product do each of Skye's children like?
- What does Skye do now? What does she like to share with others?

Chapter 14

- What type of insects did Australia's First nations people eat?
- Make a list of the various bugs eaten in different countries. What do you think flying ant salsa would taste like?
- How is bug food more sustainable as a protein substitute? Write down some key points from this list and create a poster to hang up in your classroom or perhaps the school canteen to encourage bug products being eaten.

Skye's bug recipes

- Find out about some restaurants that have used Skye's bugs in their recipes.
- Try cooking one of Skye's recipes that are in the back of the book. Once you have tasted the cooked product, write a review on them.

EXTENSION QUESTIONS FOR FURTHER THINKING

What if more people ate edible insects? What would be the side effects – both the good and the bad?

List the different types of bugs that are edible. Can they all be farmed? Why or why not? Explore how insects are farmed around the world and the insects that are eaten, but not farmed – try indigenous communities to learn more about these insects. Can all edible insects be used in the same types of recipes? Explore edible insect recipes from around the world to justify your response.

How do scientists decide which insects should be farmed? Give examples.

How do scientists decide which nutrients are most important for our bodies? Give examples of the research they do to have this knowledge.

Analogy: How is an ant like a weightlifter? How is a butterfly like a ballet dancer? Create your own analogies to compare insects to jobs or activities people do.

Create your own product with a brand name, logo, ingredients and recipe, based on what Skye has come up with, for a food product that involves bugs. Think of the flavours described in Thailand, in Skye's commercial kitchen and her cooking shows and mix that into something you like.

Compare: How is Skye like you? How is she different from you? Is there any way you would like to be like Skye?

ELABORATION OF OUTCOMES TO THE AUSTRALIAN CURRICULUM

Literacy

STAGE 2

Discuss texts in which characters, events and settings are portrayed in different ways, and speculate on the authors' reasons (ACELT1594).

Draw connections between personal experiences and the worlds of texts, and share responses with others (ACELT1596).

Develop criteria for establishing personal preferences for literature (ACELT1598).

Discuss how language is used to describe the settings in texts, and explore how the settings shape the events and influence the mood of the narrative (ACELT1599).

Create imaginative texts based on characters, settings and events from students' own and other cultures using visual features, for example perspective, distance and angle (ACELT1601).

Listen to and contribute to conversations and discussions to share information and ideas and negotiate in collaborative situations (ACELY1676).

Use comprehension strategies to build literal and inferred meaning and begin to evaluate texts by drawing on a growing knowledge of context, text structures and language features (ACELY1680).

Make connections between the ways different authors may represent similar storylines, ideas and relationships (ACELT1602).

Discuss literary experiences with others, sharing responses and expressing a point of view (ACELT1603).

Discuss how authors and illustrators make stories exciting, moving and absorbing and hold readers' interest by using various techniques, for example character development and plot tension (ACELT1605).

Identify characteristic features used in imaginative, informative and persuasive texts to meet the purpose of the text (ACELY1690).

Use comprehension strategies to build literal and inferred meaning to expand content knowledge, integrating and linking ideas and analysing and evaluating texts (ACELY1692).

STAGE 3

Recognise that ideas in literary texts can be conveyed from different viewpoints, which can lead to different kinds of interpretations and responses (ACELT1610).

Make connections between students' own experiences and those of characters and events represented in texts drawn from different historical, social and cultural contexts (ACELT1613).

Analyse and evaluate similarities and differences in texts on similar topics, themes or plots (ACELT1614).

Identify, describe, and discuss similarities and differences between texts, including those by the same author or illustrator, and evaluate characteristics that define an author's individual style (ACELT1616).

Clarify understanding of content as it unfolds in formal and informal situations, connecting ideas to students' own experiences and present and justify a point of view (ACELY1699).

Navigate and read texts for specific purposes applying appropriate text processing strategies, for example predicting and confirming, monitoring meaning, skimming and scanning (ACELY1702).

Analyse how text structures and language features work together to meet the purpose of a text (ACELY1711).

Use comprehension strategies to interpret and analyse information and ideas, comparing content from a variety of textual sources including media and digital texts (ACELY1713).

STAGE 4

Identify and explore ideas and viewpoints about events, issues and characters represented in texts drawn from different historical, social and cultural contexts (ACELT1619).

Reflect on ideas and opinions about characters, settings and events in literary texts, identifying areas of agreement and difference with others and justifying a point of view (ACELT1620).

Compare the ways that language and images are used to create character, and to influence emotions and opinions in different types of texts (ACELT1621).

Recognise and analyse the ways that characterisation, events and settings are combined in narratives, and discuss the purposes and appeal of different approaches (ACELT1622).

Recognise, explain and analyse the ways literary texts draw on readers' knowledge of other texts and enable new understanding and appreciation of aesthetic qualities (ACELT1629).

Science

STAGE 2

Living things can be grouped on the basis of observable features and can be distinguished from non-living things (ACSSU044).

Science involves making predictions and describing patterns and relationships (ACSHE050 & ACSHE 61).

Science knowledge helps people to understand the effect of their actions (ACSHE051 & ACSHE62).

With guidance, plan and conduct scientific investigations to find answers to questions, considering the safe use of appropriate materials and equipment (AC SIS054 & ACSHE64).

Living things have life cycles (ACSSU072).

Living things depend on each other and the environment to survive (ACSSU073).

STAGE 3

Living things have structural features and adaptations that help them to survive in their environment (ACSSU043).

Scientific knowledge is used to solve problems and inform personal and community decisions (ACSHE083, ACSHE100).

Identify, plan and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks (AC SIS086, AC SIS103).

Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE098).

STAGE 4

Classification helps organise the diverse group of organisms (ACSSU111).

Scientific knowledge has changed peoples' understanding of the world and is refined as new evidence becomes available (ACSHE119, ACSHE134).

People use science understanding and skills in their occupations and these have influenced the development of practices in areas of human activity (ACSHE121, ACSHE136).

Identify questions and problems that can be investigated scientifically and make predictions based on scientific knowledge (AC SIS124, AC SIS139).

Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed (AC SIS125, AC SIS140).

Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures (AC SHE223, AC SHE226).