Aussie STEM Stars

SUZY URBANIAK

Volcano hunter and STEAM warrior

Story told by CRISTY BURNE

Teacher Notes

written by
Vanessa Ryan-Rendall

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ABOUT THIS 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.

Reasons 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 engaging children – making them as enjoyable 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

Cristy Burne grew up climbing trees, jumping drains, chasing runaway cows and inventing stories. Before she became a writer, she was a science circus performer, garbage analyst, Santa's pixie and an English teacher.

Cristy is a children's author, science writer and presenter. She has worked as a science communicator in the US, UK, Japan, South Africa, Switzerland and Australia, editing science magazines and contributing to children's STEM publications, including CSIRO's Double Helix and Scientriffic.

Cristy's books are published in multiple languages. She has a passion for STEM, loves learning through doing, and aims to inspire creativity, daring and resilience in her readers.

The other book in the Aussie STEM Stars series written by Cristy is about the world-famous inventor of spray-on skin, surgeon Professor Fiona Wood.

About our STEM Star: Suzy Urbaniak

Suzy Urbaniak is a geologist, limbo dancer, crêpe baker, risk-taker and the winner of the 2016 Prime Minister's Prize for Science Teaching. She is all about passion, innovation and doing things your own way. She founded the CoRE Learning Foundation (Centre of Resource Excellence Learning Foundation) – an integrated education approach that bridges the gaps between education, government, community and industry; and was the 2020 Local Hero Australian of the Year WA Australia Day Ambassador.

You can check out the CoRE Learning Foundation website:
www.corefoundation.com.au
And contact her at:
suzy@corefoundation.com.au

OUTCOMES

Australian Curriculum

KEY FOCUS AREAS

Literacy Stages 2–4

Science Stages 2–4

OUTCOMES

NSW Curriculum

KEY FOCUS AREAS

Literacy Stages 3–4

Science Stages 2–4

BEFORE YOU BEGIN READING THIS BOOK

Front cover

- What do you know about Suzy Urbaniak?
- What do you know about volcanoes and people who study them?
- What do you think when you read the words 'Volcano hunter and STEAM warrior?'

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

- Draw attention to the quote on **page iii** in the book:

  You're living on a beautiful Earth. Appreciate it. Understand it.
  And the way to understand it is through tricks.
  Geoscience is the discipline that brings us closer to our planet.

  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 Cristy Burne 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: Mining – we can't live with it, we can't live without it!

- How is mining helpful yet harmful?
- Explore the different reasons we mine and categorise these reasons into helpful and harmful.
- Do some reasons travel across both?

Key project 2: Geology

- Using natural spaces in your area, take soil and rock samples to learn more about what you are walking on every day. Find out if these samples are local to your area or if they have been brought in through construction processes.
- Create a way to show your findings to your classmates so they understand more about the things beneath their feet.

Key project 3: Volcanoes

- What are the different types of volcanoes that exist in the world today and that existed in the past?
- How do different volcanoes create different landscapes?
- Create an interactive display to show the class the different types of volcanoes, the landscapes they create and how they erupt differently.

Key project 4: Education

- If you were to design your own school, how do you think it would need to function so that students are learning and also remain motivated, curious and creative?
- Create an outline of what you think would need to happen, the expectations of students, any rules needed and what the school would look like – even in the way classrooms are set up and the school itself is designed.

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 Suzy Urbaniak do and say in this chapter? How did she feel?	
What real life events occurred? Link some dates and extra details to this event.	
New vocabulary you have learned in this chapter.	
How has the author made you feel? Think of the language used to create tension, happiness, wonder, anxiety, sadness.	

Reflect on this table after the book has been read

- How did your knowledge change throughout the book?
- How did your feelings change?
- Did the characters seem to change as you learnt more about them? Which events caused changes to take place in them?
- What new vocabulary have you learned overall?

TEACHING AND LEARNING ACTIVITIES

Chapter 1

1. Where is the Maribyrnong River?
2. List some of the words used in this chapter that relate to geology.
3. What is a feral cat? How do they become feral? What are the problems with cats becoming feral in Australia? What laws have some councils brought in to minimise this problem?
4. How did St Albans change from when Suzy was a child? Why did it change?
5. List some sentences that make you feel as if you are there with Suzy, down by the river.
6. Discuss the proposition that the present is the key to our past, and the past the key to our future.
7. Go to a map and find out where Mt Gambier and Mt Schank are in Australia. How do scientists know there were volcanoes in those locations?

Chapter 2

1. How did the start of this chapter make you feel? How did it help you learn more about Suzy?
2. How can a heart be compared to a moth? What else can your heart or another organ in your body be compared to when you are feeling different emotions?
3. Which country has Polish as its main language?
4. Why was it okay to be Greek or Italian when Suzy was growing up?
5. Draw an image of what you think Suzy would see from the monkey bars as she hangs upside down from her legs.
6. How can being different ache in your heart? Give some examples from the story and also from your own experiences.

Chapter 3

1. What is a ‘Kodak shop’? Why would you need to wait a week to pick up photos?
2. What would Suzy prefer to be doing?
3. Who is in Suzy’s family?
4. What were the different types of sausages the family made at their butcher shop? Find out what might be in some of these sausages by doing some research.

5. Why do you think Big Djadzu kept the spoon he had used in the refugee camp?
6. What is a drive-in?
7. Imagine you are at one of Suzy's family parties. Write a description of what you saw, ate and did.

Chapter 4

1. Imagine the canteen had a mixture of foods from around the world on offer. Create a canteen menu that contains some Polish food as well as other foods that could be on offer at your school canteen. Make sure you include a description of the food.
2. Find the simile used to describe what Suzy went through on her run back home to get her lunch. Think of some more you could add.
3. Why do schools have so many rules? How do you think this has a positive and a negative effect on students and teachers?
4. Can you draw a perfect circle free hand? Do you think this is a fair activity to do? Why do you think her teacher wanted the class to do this?
5. Why do you think we need to be given the chance to discover who we really are? What does that mean do you think? How can this happen at school for Suzy? For you?
6. Why has the word 'BANG!' been highlighted?

Chapter 5

1. How was the car's temperature gauge described? What are these called? Create your own about something else to do with the car or the family inside.
2. Locate Suzy's family's camping spot on a map.
3. Why are swimming lessons important?
4. Who is Elvis? How can your legs shake like Elvis at a disco?
5. How can rocks tell a story?
6. Why would you put tomatoes on your sunburn?

Chapter 6

1. Who do you think invented the 'No running' rule?
2. Why do you think Suzy was on the run from the nun?
3. What did you learn about Suzy in this chapter? What has changed about Suzy? What is different?
4. What is 'flagrant disobedience'?

Chapter 7

1. What is a billycart? Have you ever built or ridden in one?
2. Create a design for your own billycart using thrown away materials. Draw and label the design.
3. How do you think the other children were feeling as they watched Suzy or sat next to her? Write a description of what you think they were thinking as this event unfolded.
4. What were the two lessons Suzy learnt? Do you think these were good lessons to learn from this experience?

Chapter 8

1. Why did Suzy hate rules so much?
2. Find a recipe for Kompot and compote. Write down how they are similar and how they are different. Try to create these recipes to see which one you enjoy most, and perhaps make your own version!
3. What does 'bewildered' mean? List the many different things that ‘bewildered’ Suzy.
4. What could Suzy’s art teacher have done instead of bark rubbing? How else could the class explore the lines and texture of trees?

Chapter 9

1. What was the TV show ‘Leyland Brothers’ about? See if you can find an old episode to discover what it was about but also why it was so popular.
2. What do scoria cones look like? Where else might you find them in Australia?
3. The Gunditjmara people who lived near Budj Bim would have seen volcanoes erupt. Find the dreamtime story which describes these eruptions.
4. What do Graptolite fossils look like?
5. When was the Permian era? What other eras were there?
6. What is a total solar eclipse? Draw a picture of what you would see if you were to look at one or take a photo.

Chapter 10

1. What is a ‘Gateau St Honoré’?
2. What other cakes did Suzy make? Which one do you think you would enjoy the best?
3. List all of the ways you think there are to be smart. Which kind of smart do you think you are?
4. How many dogs did Suzy have as she grew up? What breeds were they?

5. Why did Suzy cry until she had nothing left to cry?
6. How do you think Suzy will make it through the next four years of school?

Chapter 11

1. What is adrenaline? Why would Suzy love the adrenaline of waterskiing?
2. What is a 'dark fear'?
3. Do you think Suzy's plan of rowing to the middle of the lake would have kept her and her brother safe?

Chapter 12

1. What would someone look like if they wore fluorescent leggings and glittery legwarmers? Draw an image of this at a skating rink.
2. Why would Mrs Symon's take the class to the You Yangs?
3. What is the difference between the different types of igneous rocks?
4. How did Mrs Symons and Mrs Sahlsberg help Suzy?

Chapter 13

1. Why did many girls not want to go to university when Suzy was in Year 12?
2. Why does the author continue to describe how Suzy's heart feels throughout the story? How does it add more value for the reader in understanding her emotions?
3. What does it mean if you are 'living on eggshells'?
4. Where did Suzy go on her holiday? Find these places on a map and work out the route the tour might have taken.
5. Why did Suzy's friend write, 'If you find Chalcopyrite, you know what to do'?
6. How did Suzy feel as she read her HSC results? Explore the chain of emotions.

Chapter 14

1. What does it mean that there were subjects that she didn't really 'dig'?
2. Where did Suzy go on this road trip? Plot on a map where they went and why they would have seen some great rocks.
3. Why did her lecturer think having a family was more important than her getting a job as a Geologist?
4. What is First Class Honours?
5. Where is the Telfer Gold Mine?
6. Why was Suzy so excited about working here?

Chapter 15

1. Where is Kalgoorlie and what minerals are mined in that area?
2. What do the mines look like there?
3. In what ways did Suzy's life suddenly change?
4. What do you think Suzy would have included in her cookbooks?
5. What were the reasons that led to Suzy's decision to become a teacher?

Chapter 16

1. Is there a difference between an educator and a teacher?
2. Give some examples of how 'success is about failure'.
3. How did Suzy help her students to feel as if they were going to work instead of school?
4. What is a stromatolite?
5. Why do you think students need more than good marks in school?

Chapter 17

1. How has Suzy been 'shaking up' education?
2. Which volcano did Suzy visit and which country is it in?
3. What does Suzy think about ticking boxes and passing tests? What do you think? What is your suggestion?
4. How can you measure the Earth's magnetic field?
5. Why do you think the scientists in Antarctica were playing cricket? How do you think the rules might have to change?

Chapter 18

1. How did the new volcano that Suzy was standing on start to grow?
2. How does the author describe the lava?
3. How does the 'ohia tree' change the lava to a different form?

Chapter 19

1. In what ways did Suzy change Denzyl's life?
2. How are Suzy and Denzyl connected today?
3. Why is curiosity and self-direction important for learning?
4. Suzy has taken her children on many adventures. List some natural places you have been to and what you did there once you were in nature.
5. Find out what #therealclassroom is.

EXTENSION QUESTIONS FOR FURTHER THINKING

Develop a list of rocks that you encounter in everyday life. Present this to an audience in a way they can explore how the rocks look and feel.

Antarctica is rich in minerals – should we mine it? Discuss your reasons with your classmates.

Imagine you are a geologist living in Kalgoorlie. Describe your day at work from morning till evening. Use factual information to understand how your day would look.

Draw yourself working at a mine in Western Australia. Consider the size of the mine and machinery when drawing this.

What would happen if the education system moved away from exams? Would the learning of skills and knowledge still take place? How would this impact other areas of life – during school and afterwards when people had grown up and were working?

What do you think will happen if our education system continues to rely heavily on exams and textbooks? Do you think AI (Artificial Intelligence) will impact on this in a negative or positive way?

How is looking up to someone (Suzy looked up to Raelene Boyle for her athletic skills) important for your own development and self-esteem?

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

Natural and processed materials have a range of physical properties that can influence their use (ACSSU074).

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 (ACSIS054 & ACSHE64).

Represent and communicate observations, ideas and findings using formal and informal representations (ACSIS060).

STAGE 3

Solids, liquids and gases have different observable properties and behave in different ways (ACSSU077).

Sudden geological changes and extreme weather events can affect Earth's surface (ACSSU096).

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 (ACSIS086, ACSIS103).

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

Communicate ideas, explanations and processes using scientific representations in a variety of ways, including multi-modal texts (ACSIS110).

STAGE 4

Sedimentary, igneous and metamorphic rocks contain minerals and are formed by processes that occur within Earth over a variety of timescales (ACSSU153).

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 (ACSIS124, ACSIS139).

Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed (ACSIS125, ACSIS140).

Science knowledge can develop through collaboration across the disciplines of science and the contributions of people from a range of cultures (ACSHE223, ACSHE226).