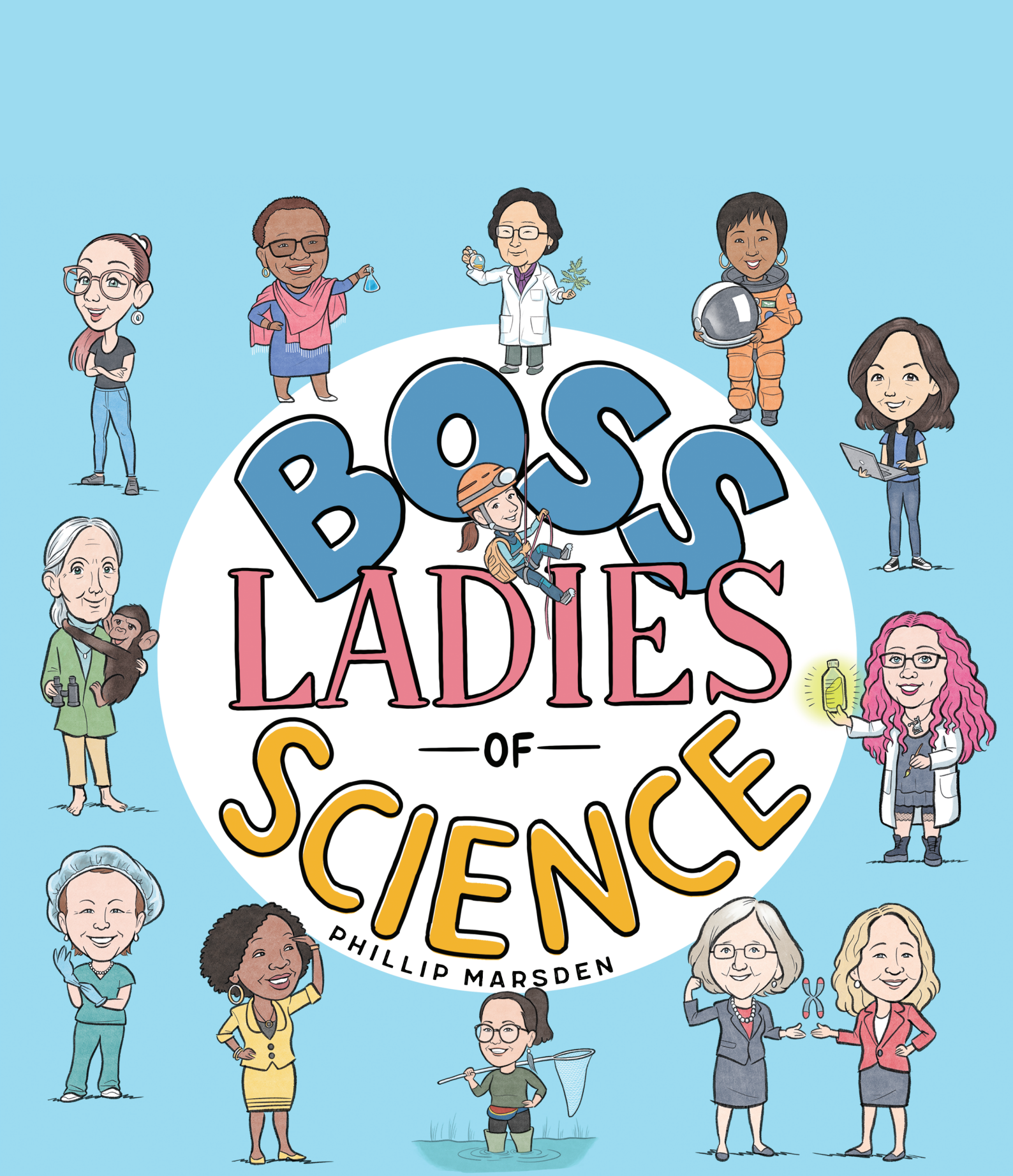

TEACHERS RESOURCES

BOSS LADIES OF SCIENCE

PHILLIP MARSDEN

Teachers Resources by Robyn Sheahan-Bright

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Themes & Curriculum Topics 3

Health and Physical Education

Humanities and Social Sciences (HASS)

English Language and Literacy

Visual Literacy

Creative Arts

Learning Technologies

Mathematics

Further Topics for Discussion and Research 6

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INTRODUCTION

Boss ladies unite!

From astronomy and quantum physics to neuroscience, vaccinology and primatology, boss ladies conquer in this illustrated celebration of inspiring and empowered female scientists from around the world.

These boss ladies, including Mae Jemison, Merritt Moore and Kiara Nirghin, answer big questions and invent grand solutions.

Every boss lady was once a little kid with a huge dream. Let their trials and triumphs inspire you to work hard at what you love, and to believe in yourself, no matter whether you fail or succeed.

'You have a choice as to whether you will make this world a better place, even in a small way.'
Jane Goodall, Primatologist

'Embrace your interests, your passions, and really give it your all!'
Jennifer Doudna, Biochemist

THEMES & CURRICULUM TOPICS

SCIENCE

Several themes are relevant to the following Curriculum Area:
<https://www.australiancurriculum.edu.au/f-10-curriculum/science/>

WOMEN IN SCIENCE

Discussion Point: Women have achieved a great deal in many scientific areas. What are the obstacles which might deter a woman from excelling in science? (Some of the profiles included in this book give some idea of how they have overcome such deterrents.)

Discussion Point: Are there still obstacles to women's participation in science?

Discussion Point: Research the achievements of any of the female scientists included in this book.

Discussion Point: Discuss some of the inspirational quotes included on each page which give the reader an idea of what motivates these scientists.

Discussion Point: Are females encouraged to participate in science and STEM subjects at your school?

Discussion Point: Do women achieve better when they are not competing against male scientists for funding or positions? What evidence have you discovered to support this claim or to dispute it?

Discussion Point: Science is an area where opposing positions on issues such as climate change fuel research. Every issue attracts a diversity of views and science is about collating, synthesising and resolving those questions. Discuss scientific method with your students and

use a simple example as a demonstration.

HUMANITIES AND SOCIAL SCIENCES (HASS)

Several themes and topics are relevant to the following Curriculum Area: <https://www.australiancurriculum.edu.au/f-10-curriculum/humanities-and-social-sciences/hass/> Investigate the following sub-topics using skills developed in this Curriculum Area relating to ***INQUIRY AND SKILLS*** and ***KNOWLEDGE AND UNDERSTANDING:***

1. *Develop Methodology and Research Using Primary and Secondary Sources;*
2. *Synthesise and Evaluate Evidence;*
3. *Present Evidence;*
4. *Develop Alternatives.*

OVERCOMING ADVERSITY

Discussion Point: Gender inequity and other factors can challenge female scientists, and these women have demonstrated how they have overcome such adversity. Which woman did you admire most, and why?

Discussion Point: Some of the women featured in this book were very young when they began their research. (For example, Ann Makosinski was only fifteen when she won the Google Science Fair award for inventing a flashlight which could be powered by the warmth of one's hand!) What hurdles might someone so young confront when endeavouring to make a career as a scientist?

ACTIVISM

Discussion Point: Many of the women featured in this book have used their success to encourage other women to not only achieve in science but also have been activists for scientific causes, such as Jane Goodall who advocates for the protection of chimpanzees and their environment; Hindu Oumarou Ibrahim who is a champion of Indigenous knowledge and women's voices in the fight against climate change; and Dr Chanda Prescod-Weinstein who campaigns against racism, sexism and advocates for queer, black and female inclusion in physics. Research the campaign of one of these women, and how she has used her success to leverage community or institutional action.

Discussion Point: Research the work of other scientists who have been activists in their fields.

ENGLISH LANGUAGE AND LITERACY

This is relevant to the following Curriculum Area:
<https://www.australiancurriculum.edu.au/f-10-curriculum/english/>
The text of this book might be studied in relation to the following aspects:

Activity: Each page is dedicated to a female scientist and contains an inspirational quote followed by a brief entry describing the scientist's achievements in Phillip Marsden's voice. Write an expository text about another female scientist you admire in the same format and style Phillip Marsden uses in this book; Marsden employs humour in several of the entries and his tone of voice is engaging. Possible scientists to research and write about might be: Katherine Belov, Jessica Melbourne-Thomas and Maria Pia Abbrachio. [See **Bibliography**.]

[See also **Worksheet 4**.]

Activity: Visit: 'The University in Verse' *The Marginalian* <https://www.themarginalian.org/the-universe-in-verse/> This is a project which celebrates science via poetry. Write **poems** to celebrate female scientists' achievements. [See **Worksheet 2**.]

Activity: Test your students' **comprehension** by asking them questions about the written and visual text. [See also **Worksheet 3.** below.]

VISUAL LITERACY

This is relevant to the following Curriculum Area:
<https://www.australiancurriculum.edu.au/f-10-curriculum/the-arts/visual-arts/>
The visual text of a book combines with the written text to tell the story using the various parts of the book's design and illustrations, as explored below.

Activity: The **cover** of a book is an important part of its message. Back and front covers feature a circle surrounded by images of women. Create a different cover for this book.

Activity: The **endpapers** contain silhouettes of the women featured in the books. Invite students to identify the women depicted there. Then create your own images to decorate alternative endpapers for this book.

Discussion Point: The **title page** contains the title in a decorative typeface. What impression does this title page give to the reader?

Discussion Point: The **format** of the book is uniform in the **layout of internal pages**. How does this design of the book influence your reading of it?

Activity: The **medium** of illustration employed is cartoon/comic in style. Invite students to draw a cartoon image of the scientist described in the writing exercise above. Collate all the entries written and illustrated by the class and you will have your own *Boss Ladies of Science* book! Create a classroom display using all the images. [See also **Worksheet 1.** below.] [See **Bibliography**.]

CREATIVE ARTS

There are many creative activities suggested by this text:
1. Create a **slogan** about the achievements of women in science.

2. Create a **postcard** carrying this slogan and an image promoting women in science.

3. Create a **poster** using this slogan.

4. Create a **short script** for an advertising campaign encouraging young women and girls to study science.

5. Create a **book trailer** to promote this book. [See **Bibliography**.]

LEARNING TECHNOLOGIES

Activity: Research the author/illustrator online. [See **Bibliography**.]
Mathematics

Activity: Have fun counting things in this text, on the endpapers and in the internal pages of the book.

FURTHER TOPICS FOR DISCUSSION AND RESEARCH

- Phillip Marsden is a multi-talented artist. Try to discover information about his other work online.
- Students might research this book in conjunction to reading other books about women in science such as those listed in the **Bibliography**.
- Investigate any other topic not covered in these notes which you consider is suggested by this text.

CONCLUSION

This is a vibrantly illustrated work of non-fiction which provides information in a very accessible and entertaining style. The comic illustrations and the accessible and casual writing style will engage students and encourage them to discover more about these impressive contemporary women in science.

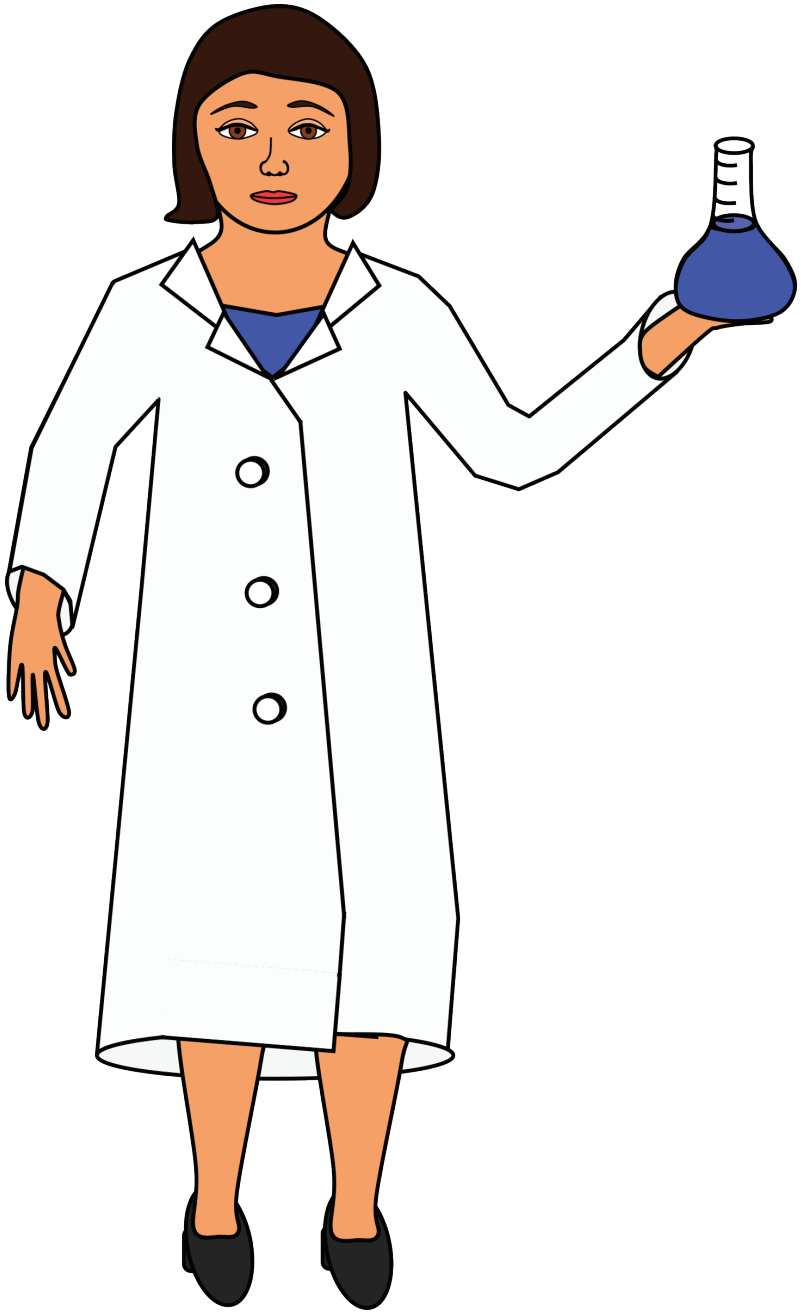
ABOUT THE AUTHOR/ILLUSTRATOR

Phillip Marsden is a Sydney-based full-time illustrator from Liverpool, England. He is a regular contributor to magazines such as *Kerrang*, *NME* and *Elle*, has illustrated books such as *Kicking Goals* (with Adam Goodes), *I Can't Remember the Title But the Cover Is Blue* by Elias Greig, *A Boy Called Bob* by Bob Murphy and Tony Wilson and *A Footy Girl's Guide to the Stars of 2017* by Nicole Hayes and Alicia Sometimes. Phillip regularly hosts drawing workshops for kids.
Visit his website for further information: https://www.phillipmarsden.com/

WORKSHEETS

WORKSHEET 1. WOMAN SCIENTIST DRAWING

Finish this image by colouring it in and then create a collage by filling in the background.



WORKSHEET 2. POEM

A. Write a simple Acrostic poem using the letters in NANOGIRL.

N
A
N
O
G
I
R
L

B. Write a Haiku poem about Fiona Wood.

C. Write a Cinquain poem about Merritt Moore.

WORKSHEET 3. QUIZ

1. How many silhouetted figures are on the endpapers?

2. Who is Australia's Chief Scientist?

3. Who was the youngest woman in this book to achieve a breakthrough invention?

4. Which of these women mentioned has won a Nobel Prize?

5. Who uses the nickname Nanogirl?

6. Who is in charge of the particle physics laboratory in Switzerland called CERN?

7. Who is a professional ballet dancer as well as a quantum physicist?

8. Who was the first woman of colour to go into space?

9. What is Professor Fiona Wood known for as a medical researcher and plastic surgeon?

10. Which young Indigenous Australian astrophysicist features in this book?

Answers: 1. Seventeen on the front and fifteen on the back **2.** Dr Cathy Foley. **3.** Ann Makosinski **4.** Prof Elizabeth Blackburn (Australia/USA) and Dr Carol Greider (USA) won a Nobel Prize (along with Jack Szostak) in 2009; Dr Jennifer Doudna (USA) and Prof Emmanuelle Charpentier (France) in 2020; Dr May-Britt Moser in 2014; Tu Youyou in 2015 **5.** Michelle Dickinson **6.** Italian Dr Fabiola Gianotti **7.** Merritt Moore **8.** Dr Mae Jemison **9.** Her invention of 'spray-on skin' to treat serious burns **10.** Kirsten Banks

WORKSHEET 4. ALPHABET OF FEMALE SCIENTISTS

NAME	SCIENTIFIC AREA	FACT
Abbrachio, Maria Pia.	**Pharmacology**	She has conducted research all over the world and is one of the scientists Thomson Reuters has named as most cited scientists since 2006.
Belov, Katherine	**Genomics**	Throughout her career, she has disproved the idea that marsupial immune system is primitive.
C		
D		
E		
F		
G		
H		
I		
J		
K		
L		
Melbourne-Thomas, Jessica	**Marine, Antarctic and Climate Change Science**	Co-founder, along with business entrepreneur Fabian Dattner, of the first Homeward Bound voyage, which is an Australian-led, global initiative to foster women's leadership in science.

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<https://www.themarginalian.org/the-universe-in-verse/>

ABOUT THE AUTHOR OF THE NOTES

Dr Robyn Sheahan-Bright AM operates justified text writing and publishing consultancy services, and is widely published on children's literature, publishing history and Australian fiction. In 2011 she was the recipient of the CBCA (Qld Branch) Dame Annabelle Rankin Award for Distinguished Services to Children's Literature in Queensland, in 2012 the CBCA Nan Chauncy Award for Distinguished Services to Children's Literature in Australia, and in 2014, the QWC's Johnno Award. In 2021 she was appointed a Member of the Order of Australia.