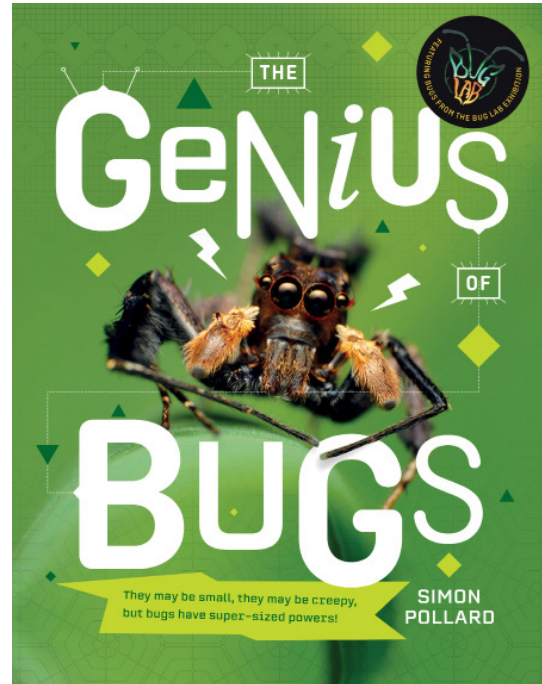


The Genius of Bugs

Simon Pollard

They may be small, they may be creepy, but bugs have super-sized powers! Meet a roll call of some of New Zealand and the world's most incredible bugs – from the cunning portia spider to the killer brain-surgeon jewel wasp. *The Genius of Bugs* is a new, fresh take on bugs, packed with tales, facts and figures that showcase bug ingenuity and reveal astounding bug behaviour.



Simon Pollard is a successful children's book author, spider expert and natural history writer. Currently Adjunct Professor of Science Communication at the University of Canterbury, Simon is the author of the award-winning *I Am a Spider* (Reed, 2004) and *I Am an Insect* (Reed, 2002). He is a frequent contributor to *Natural History* (US), *BBC Wildlife* (UK), *New Zealand Geographic* and *Nature Australia* magazines and has worked as an advisor and script writer for many natural history documentaries, including *The Hunt* (BBC, 2015) and *Planet Earth* (BBC, 2006). His book *Dear Alison* (Penguin, 2009) won the 2010 Children's Choice Award for non-fiction at the New Zealand Post Children's Book Awards and the 2010 LIANZA Elsie Locke Award, Non-fiction Book of the Year.

Specifications

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PAGE EXTENT: 32 pages, portrait
FORMAT: Paperback
SIZE: 270mm x 210mm
ILLUSTRATIONS: Full-colour throughout
READERSHIP: 6+

TEACHING NOTES INCLUDE:

- 7 Before-reading questions
- 29 Close-reading questions
- 8 Language and style questions
- 34 Activities and creative responses across a range of curriculum areas (Literacy, Numeracy, Science, Social sciences, the Arts, Technology and Physical education and health).



Before reading:

1. What do the front and back cover pictures indicate about the book's content?
 2. What does the title suggest to you?
 3. Who do you think the readership of this book will be?
 4. Brainstorm and discuss what you know about bugs.
 5. What is the scientific name that could have been used in the title instead of bugs? Why do you think the author made this vocabulary choice?
 6. In the title, the author used the term 'genius'. Find out the dictionary definition of the word 'genius'. Why do you think the author chose to use this word in the title?
 7. Read the author's dedication (p. 2). If you wrote a book, to whom would you dedicate it and what would the dedication say?
3. Predict how, and in what ways, you think 'the world of science peeks into the world of bugs' (p. 5)?
 4. What other informal word does the author use for 'bugs' (p. 5)?

WEAPONS:

5. What is the definition of a 'predator' (p. 6)? What do you call the opposite of a predator?
6. What weakness makes it necessary for the bombardier beetle to protect itself with a 'toxic spray' (p. 6)?
7. How does the bombardier beetle manage to remain unharmed by the deadly chemicals it produces (p. 6)?
8. Why are the X-ray machines scientists use to see inside the bombardier beetle so expensive (p. 7)?
9. The Southeast Asian spitting spider uses its silk as a weapon (p. 8). Why and how does it do this?
10. Where are the glands which store the silk and glue found in the Southeast Asian spitting spider (p. 9)?
11. Why do adult male ant-mimicking jumping spiders have to stab their prey with their fangs, rather than inject venom (p. 10)?
12. What does the author refer to as a 'first-rate bug weapon' (p. 11). Find three examples of how bugs can store and/or use this weapon.

ENGINEERING:

13. Make a list of the facts which relate to the 'marvel of miniature engineering' that is the dragonfly (pp. 12–13)?
14. What is the reason for scientists being unable to make 'a tiny robot that can fly like a dragonfly' (p. 12)?
15. How does the jewel wasp manage to turn a live cockroach into a 'perfect nest' (pp. 14–15)?
16. What is the moss piglet's 'secret' and how does this secret work in their favour (p. 16)?

Close-reading questions:

INTRODUCTION:

1. How long have bugs been on the earth (p. 4)? How does this compare to how long humans have been on the earth?
2. What animal does the author compare a dragonfly's hunting prowess with (p. 5)? What does this help us infer about the dragonfly and its hunting skills?

17. What product does the author compare 'the sticky glue droplets or a tangle of silken threads' of spider webs to (p. 17)? What does this tell us about the webs?
18. How many types of silk can spiders spin, and what are some of the different jobs the silk is used for (p. 17)?

DECEPTION:

19. What are some of the tactics a portia jumping spider uses to outwit its prey (p. 18)?
20. How does the author describe what the 'very well camouflaged' portia jumping spider looks like as it stalks other jumping spiders (p. 19)?
21. In which ways is the orchid mantis 'one of the best scammers in the bug world' (p. 20)?
22. What is the reason for some female fireflies to become 'tricky cannibals' (p. 22)?
23. Why do some bugs use camouflage (p. 23)? Find two examples from this page.

TEAMWORK:

24. How do the Japanese honey bees work together to stop their enemy, the Japanese giant hornet (pp. 24–25)?
25. How many honey bees can a hornet kill within a three-hour timeframe (p. 25)?
26. How do weaver ants work together to make their 'ball-shaped nest' (pp. 26–27)?
27. What part of the human body do scientists think the termite mounds act like and why (p. 28)?
28. How do termite soldiers warn the colony if they have detected a threat (p. 28)?

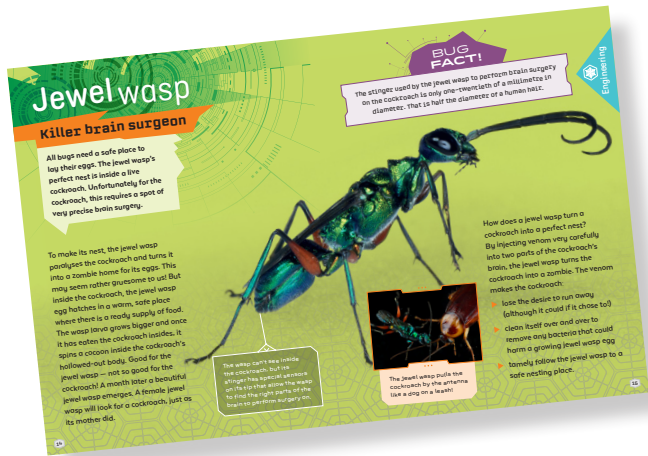
NEW ZEALAND BUGS:

29. What are the three New Zealand bugs mentioned (p. 29)? Note down one interesting fact about each of the three bugs.

Language and style:

1. What do you think the genre of this book is? List the aspects that are indicative of this genre.
2. How has the author divided this book thematically? What are the themes? Find an example of a bug from each of the book's themed sections.
3. On the front and back covers of the book, the author has used adjectives to describe five different bugs. What is an adjective and what is its purpose? List the adjectives the author has chosen from the bugs on the covers. Choose two more bugs for the book and think of a suitable adjective for each.
4. Figurative language is used to convey ideas that might otherwise be difficult to express. A simile is an example of figurative language. Examples of this are 'the venom is injected into the prey's body, just like a needle that doctors use to give injections' (p. 11), or 'it's as if they have built a firefly lighthouse in a tree' (p. 22). Find two more examples of figurative language used by the author in the book.
5. What figure of speech are 'fang fighter' (p. 10) and 'team of tiny tailors' (p. 26) examples of? Find some other examples of this figure of speech from the book, and create your own for five other bugs from the book and/or ten other letters of the alphabet.





6. The book contains a glossary (p. 32). Discuss what the purpose of a glossary is and how it aids the reader. Using the information in the book as inspiration, create an illustrated sentence for five of the words found in the glossary.
7. The book contains an index (p. 32). Discuss what the purpose of an index is and how it aids the reader. Choose one of the words in the index. In pairs, have a race to see how quickly you can find the information on the correct page relating to your chosen word.
8. Do you like the design and layout of the book? Why or why not? In pairs, choose one page you could redesign. Discuss the changes you would make. Think about the colours, fonts, placement and layout of the information.

Activities and creative responses:

LITERACY – ENGLISH

1. Look at the four themed sections – weapons, engineering, deception and teamwork – found on the contents page (p. 2). Divide the class into groups and get each group to create a Venn diagram based on one of the sections to compare and find similarities between humans and bugs.
2. Choose your favourite section from the book to summarise. Present your summary in a poster, PowerPoint presentation, pamphlet or video format to your class.

3. The author asks the reader to ‘imagine you are a bug living in a bug world’ (p. 4). Write a short story, descriptive paragraph or poem from the point of view of one of the bugs in the book, for example, the bombardier beetle with its ‘boiling hot mixture of deadly chemicals’ (p. 6), or the moss piglet surviving in space ‘without a space suit!’ (p. 16). Imagine how your chosen bug feels, lives and behaves in its environs, as it navigates this amazing and dangerous world.
4. Choose one of the photographs from the book as inspiration for a poem. Choose a form of poetry, such as a rhyming ballad, a concrete or shape poem, a limerick, a haiku or a list poem.
5. Use the information about the various bugs that you have learnt from the book to create your own ‘genius’ bug. Create an illustrated entry for a junior level encyclopedia about your bug. Include facts about its physical appearance, natural habitat, food, calls, enemies, special talents, how to hunt it, etc, as well as a story, myth or legend about it. Or, using the same design and layout as the book, create a double-page spread about your bug.
6. Imagine you are a nature journalist specialising in entomology. Find out if there are any unusual bugs endemic to your local area. Research and write an article about one of these bugs. Present it in a newspaper or magazine article format, including photographs.
7. Choose your favourite photo from the book and find the source from the ‘Image Credits’ section (p. 2). Use an internet search engine, such as Google, to find out any possible information about the photographer. Then write a short biography on the photographer and their work.
8. Choose one of the ‘Bug Fact!’ sections as inspiration to write, illustrate and bind a story about the bug fact as a children’s picture book. Read your book to a younger year level in your school.

- List what you think are the ten most interesting facts from the book. Share your facts with a classmate. See if they have similar facts.
- After a close reading of the book, choose your favourite section to write your own comprehension questions about. Then create a quiz of ten questions based on your findings. Ask a classmate your quiz questions.
- Author Simon Pollard is a spider expert and natural history writer. Imagine you have invited him to your school as a guest speaker. Write out ten interview questions to ask him about his life and career, the writing of the book and/or bugs.
- Review the book for your favourite magazine or website. What do you like about the book? Why? What do you dislike about the book? Why? Consider the design, photographs, information and writing style. Also include your personal opinion of the book and the age group you think it is suitable for. Give it a rating, such as stars or a number out of ten.

NUMERACY – MATHEMATICS AND STATISTICS

- Create a statistical enquiry based on information about bugs taken from the book or those found in your local area, such as, how do the lifespans of the different types of bugs relate to their size (pp. 30–31). Present your findings in the most appropriate statistical format, for example, bar graphs, dot graphs, pie charts, etc.
- Find and note down any numerical facts about the bugs in the book to create a mathematical bug fact book. You could take inspiration from the book and divide it into themed sections, such as strength, size, speed, temperatures, population size, etc.

SCIENCE

- Choose two of the bugs from the book to investigate further. Find out about their natural habitats, food, predators, etc. Present your findings to your class.

- Choose one of the bugs from the book and sketch it using scientific drawing techniques, such as having a title, scale, labels, stippling, etc.
- Use the book as inspiration to investigate a bug found in your local area. Next, using the information you collected, design and create a suitable and ethical bug habitat in which the bug could live.
- Create your own ‘genius’ bug in order to create an entry for the ‘Genius bugs close-up’ section of the book (pp. 30–31). Present your bug’s statistical information using the same design, layout and ‘actual size’ diagram featured in the book.
- Choose two bugs that are endemic to New Zealand in order to create entries.
- In the ‘Genius bugs close-up’ section of the book, a language is used when categorising bugs’ families and species (p. 31). What language is used? Why is it used in this context? Investigate, learn and converse with your classmates using some common phrases found in this language.



SOCIAL SCIENCES

21. Choose five bugs from the book to research. Present where they are all found by locating them on a map of the world. In small groups, choose one of these bugs and investigate the country in which it is found. Learn and converse with your group members using some common phrases in the language of that country.
22. (*EOTC opportunity*). Visit a museum and/or zoo to find out which native bugs inhabit, or once inhabited, your local area, country and/or continent. Write an illustrated report of your findings. Present it to the class.
23. Imagine you are the travel writer from the late 1800s who unwittingly stumbled across the Southeast Asian orchid mantis (p. 20). Write a travel article about your trip and discovery. Think about the style, vocabulary and format that an article written in this period of history might use.
24. Choose one of the bugs from the book. Imagine that your chosen bug has become an endangered species. Design and create a campaign to draw attention to your bug's plight. The campaign could include elements such as pamphlets, posters, slogans, etc. Remember to use persuasive language, as well as describing the steps supporters could take to help ensure your chosen bug's survival.

THE ARTS

25. Use another medium, for example, drawing, painting, sculpture or photography, to create your own artistic interpretation of one of the bugs from the book. For example, create a weaving of a staircase spiderweb (p. 17), a collage of the Japanese honey bees (pp. 24–25) or a sculpture of a mountain stone wētā (p. 29).
26. Choose one of the bugs from the book to investigate further. Find out where it lives. Create a diorama of your chosen bug's natural habitat.

27. Choose some interesting information from the book, for example, how the backside blaster of a bombardier beetle works (p. 7) or how weaver ants work together as a team to make a nest (pp. 26–27). Present your chosen bug-related information in a user-friendly, step-by-step instructional cartoon or story board format.
28. There are many bugs in the book. Get one student to choose a bug to describe using only three statements. As a class, try and guess which bug has been described.
29. Using the drama convention of 'hot-seating', in pairs, choose one of the bugs to embody, as well as its predator or victim, for example the jewel wasp and the zombie cockroach. Get the class to ask questions about what it is like to be the predator and prey, your relationship as bugs and how you feel about each other.
30. In groups, choose and adapt bugs from the book for a puppet theatre performance in your classroom. Devise a script, create scenery, choose music and make puppets to represent your bug characters. Act out your adaptation. If you have access to a video camera, record it.
31. Design a 'wanted poster' for one of the deadly bugs, such as the jewel wasp (p. 14–15). Include a picture of the bug, describe its appearance, what its prey is and how it kills it, as well as where it is found.

TECHNOLOGY

32. Design and create a board or computer game about bugs. Write interesting bug fact question cards and/or directions on the board spaces to help the game progress, for example, 'You work together to defeat the hornet. Move forward three spaces', or 'You get trapped in a spider web. Miss a turn'. Make playing pieces in the shape of some of the bugs found in the book. Create a pamphlet explaining the rules and how to play it. Create your own advertising/marketing campaign for your board or computer game.



The campaign could include elements such as pamphlets, scripts for radio jingles and television commercials, posters, slogans, etc. Remember to use persuasive language.

33. In groups, imagine you are a television production company attempting to gain financial backing to create a nature television documentary show about bugs in your local area. Write up and present your proposal to the class. Include information such as your choice of title music and credits, presenter, show name and content, preferred channel and time slot, location, etc. For ideas, study nature documentaries on bugs.

PHYSICAL EDUCATION AND HEALTH

34. Adapt the game 'Seaweed' to make it bug related. For example, the students being the seaweed could be portia jumping spiders and the students trying to get past are the spiders' prey, as they practise fundamental movements, such as dodging, ducking and weaving.