

Rocks, Fossils and Formations: Discoveries Through Time

AUTHOR

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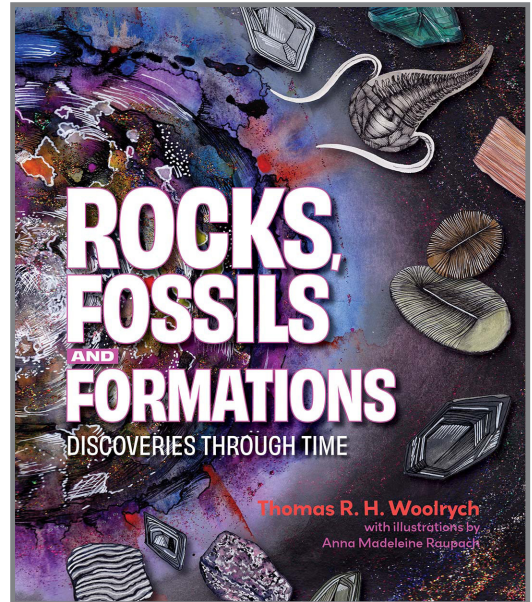
ILLUSTRATOR

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RECOMMENDED FOR: Upper Primary



SYNOPSIS

Have you ever wondered about those rocks under your feet? How old they might be? How they got their colour and texture? Could they contain some unknown mineral or fossil treasure?

Rocks, Fossils and Formations: Discoveries Through Time is an introduction to geoscience, which uses clues in rocks and the landscape to tell the story of the Earth. It's a story so old and so fascinating that it's almost hard to believe except that the evidence can be seen all around us!

Come on a 4.6-billion-year-long time travel adventure to explore rocks, minerals and fossils, meet ancient plants and animals, and discover how the continent of Australia was created!

ABOUT THE AUTHOR

Thomas R. H. Woolrych is a science communicator and exploration geoscientist with a passion for discovering the secrets of the Earth. He enjoys sharing this passion and looking for minerals.

ABOUT THE ILLUSTRATOR

Anna Madeleine Raupach is a multidisciplinary artist based on Ngannawal, Ngambri country, Canberra. Her practice spans drawing, moving image, installation and digital media to explore expressive interpretations of scientific concepts.

STUDY NOTES

BEFORE READING

- Take students out to visit a part of the school grounds or local community with large amounts of exposed rock. This can be a single formation, natural or artificially landscaped. Discuss with the students how the location came to look that way. What might it have looked like centuries ago? Invite students to imagine what the ground looks like a few metres beneath their feet, or perhaps hundreds of metres underground. Encourage them to examine the material up close and compare rocks. Discuss whether the rocks might have been transported there by water, wind or even people. Are the large rocks made of smaller pieces? Are they smooth or rough? What colours can they see?

DISCUSSION QUESTIONS AND ACTIVITIES**SCIENCE**

- Read the Introduction, with a focus on ‘Uniformitarianism vs catastrophism’ on p 10 of *Rocks, Fossils and Formations*. Discuss how geologists now understand Earth is 4.54 billion years old, and its surface has been shaped by a mix of sudden catastrophes and slow processes. What evidence helped convince geologists of these facts?
- Discuss the different features of all of the objects in the Solar System, such as their masses, atmospheres, temperatures, or even how many moons they have. What makes them different? Using information in ‘How to build a planet’ on p 17, discuss how different planets might have come to have such unique features.
- Read about the rock cycle on pp 30–32. Ask the students to compare the different kinds of rocks with different types of food items. Which foods are built in layers? Which are baked hard and smooth? Which are crumbly? How are each made? Discuss how heat and pressure change not just the things we cook, but rocks as well.
- Ask students to describe their impression of a fossil. Read ‘First life’ on p 38, including the text ‘What is a fossil?’, and reflect on the low likelihood of fossilisation occurring for any single organism. What might the challenges be in using fossils to understand the history of life on Earth?
- Strange as it seems, technically speaking, Earth is in an ice age. Read the definition of ice ages on p 54 in the section ‘A global ice house’, and discuss how moving rivers of ice can leave their mark on the landscape. How might global warming leave its own signature on the surface of the planet in the future? Follow on to p 113, reading ‘Humans and the climate crisis’, to inspire further conversation on how we’re leaving our mark on Earth permanently.
- Read ‘Cold-weather coal’ on pp 78–79, noting how the fossil fuels we’ve used for energy in the past 200 years were mostly created during the Carboniferous period. Discuss why there is no large scale natural generation of coal today.
- Dinosaurs emerged as a new kind of animal around 230 million years ago. Read ‘Dinotopia’ on p 90, and discuss what small changes to reptiles sparked such big changes in animal diversity, eventually leading to the evolution of modern birds. Ask the students to imagine what small changes to a single type of animal today might lead to big evolutionary changes in the future.
- Australia isn’t regarded as a destination for volcano hunters. But there are still plenty of signs of old, dead volcanoes if you know where to look. Read pp 102–104, and discuss how Australia’s volcanoes appeared and disappeared over tens of millions of years. How might this extinct chain of volcanoes make Australia’s east coast so different to the continent’s west coast today?

ENGLISH

- The book’s author, Thomas R. H. Woolrych, invites the reader on a ‘time travel adventure’. If time travel isn’t something people can actually do, why might the author include this feature in a book about science? Does it help the reader, or make it harder for them to learn about geology?
- Each chapter of the book is set out in chronological order, meaning they are set out according to a sequence of events in time. What are some other ways an author might arrange similar information?
- Share with the students some recipes for popular foods, discussing the format of the text. Ask them why they think it is structured the way it is. Why are the ingredients listed as they are? Why are the steps numbered? Ask the students to choose a type of metamorphic rock from the book, and read about its formation. What sedimentary rock is it made from? How is the sedimentary rock itself formed? Instruct them to use the format of a recipe to explain how their choice of metamorphic rock is formed.

ABORIGINAL AND TORRES STRAIT ISLANDER HISTORIES AND CULTURES

- Read pp 65–66 and discuss how geologists think Uluru formed. The First Nations people local to the lands Uluru is on, the Anangu, pass on accounts with different meanings. What makes geological explanations of Uluru useful for us today? Why might other stories about Uluru’s history be useful to people living on country?