Dr Chris Thorogood

Illustrated by
Amy Grimes

WHEN PLANTS TOOK OVER THE PLANET

The Amazing Story of Plant Evolution

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QED

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First published in 2021 by QED Publishing,
an imprint of The Quarto Group.
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London N7 9BH, United Kingdom.
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www.QuartoKnows.com

Editor: Nancy Dickmann
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Associate Publisher: Holly Willsher

A catalogue record for this book is available from the British Library.

ISBN 978 0 7112 6126 6
eISBN 978 0 7112 6129 7

Manufactured in Guangdong, China CC052021

9 8 7 6 5 4 3 2 1

MIX
Paper from responsible sources
FSC® C008047

"My sincere thanks to Sandy Hetherington for his many helpful suggestions to improve the book."
C T

"For the team who have worked together on this book through the months of lockdown, spent thinking of the great outdoors."
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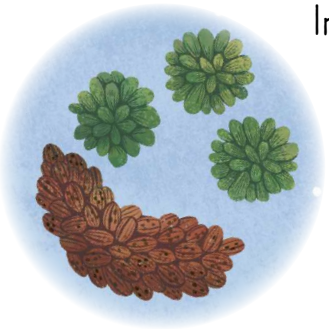
WHERE DO PLANTS COME FROM?



Imagine a land without plants. There would be no animals, of course, because animals depend on plants for their existence. But then, about 500 million years ago, something appeared in a pond. It may not have looked like much, but it would change our planet forever! This tiny plant, a type of green alga called a charophyte, was the great-great-great-grandparent of all the incredible plants we see alive today.

The journey begins

Plants moved out of the water onto land about 470 million years ago. It wasn't an easy change, as they needed a protective layer to prevent them from drying out. These land conquerors came in the form of bryophytes – the mosses, liverworts and hornworts. You can still find them growing in wet places today. Next came lycopods, with advanced plumbing systems that let them tower high above the ground. By 350 million years ago, they formed some of the first forests.

Seeds of success

Stepping out of the prehistoric swamps, look up, and you'll see more familiar trees towering above you. They are the ancestors of the gymnosperms, which include conifers like the ones alive today. Unlike the first land plants, which reproduced using tiny spores, gymnosperms had seeds. Seeds were the key to conquering the land. Seeds could remain dormant until the conditions were right for sprouting, and meant that plants no longer had to stick to wet habitats. There was no stopping plants now!

Plant life blossoms

If a world without plants is too hard to imagine, how about a world without flowers? Over 100 million years ago there was an explosion of colour on our green planet. Flowering plants called the angiosperms used colour, smell and sugary rewards to entice insects, animals and birds to disperse their pollen and seeds, and the landscape started to look very different. Today, flowering plants have turned our planet into a kaleidoscope of colour.

CHANGING WITH THE TIMES

Plants were able to conquer the land because of evolution. They evolved gradually, through tiny changes, over many generations. But just as in all living things, a plant does not choose to evolve. Instead, random changes to its genes may control how the plant grows – these are called mutations. Most mutations make the plant less likely to survive. But just once in a while, a mutation gives the plant an advantage – for example, enabling it to grow in a new type of habitat. The plant will pass on the new mutation to its offspring. We call this process natural selection.

Plants today

Look out for the magnifying glass to see where in the world you can find the plants.

Fossil forests

Are you ready to go on a prehistoric plant safari? We're going to swim through ancient swamps, climb towering trees and trek through the very first fossil forests, in search of the ancestors of today's plants. Along the way, we'll examine living examples too, piecing together the jigsaw of plant evolution. As you uncover each group of plants, see if you can spot the changes that led to their success.