

Reading beyond the classroom

Maths, Years 10 – 11.

BYRCHALL
HIGH SCHOOL

While in Years 10 and 11 students should try and read a wide variety of books. Books, newspapers and magazines are a good source of reading and these types of text will help prepare students to be broader minded with their real life applications of mathematics and will hopefully contribute to their accurate application of mathematics in, for example, becoming economically independent citizens. Of course, this will also contribute to students' successes at GCSE and beyond to provide them with adequate stepping stones to their desired career.

There are a number of high-quality websites:

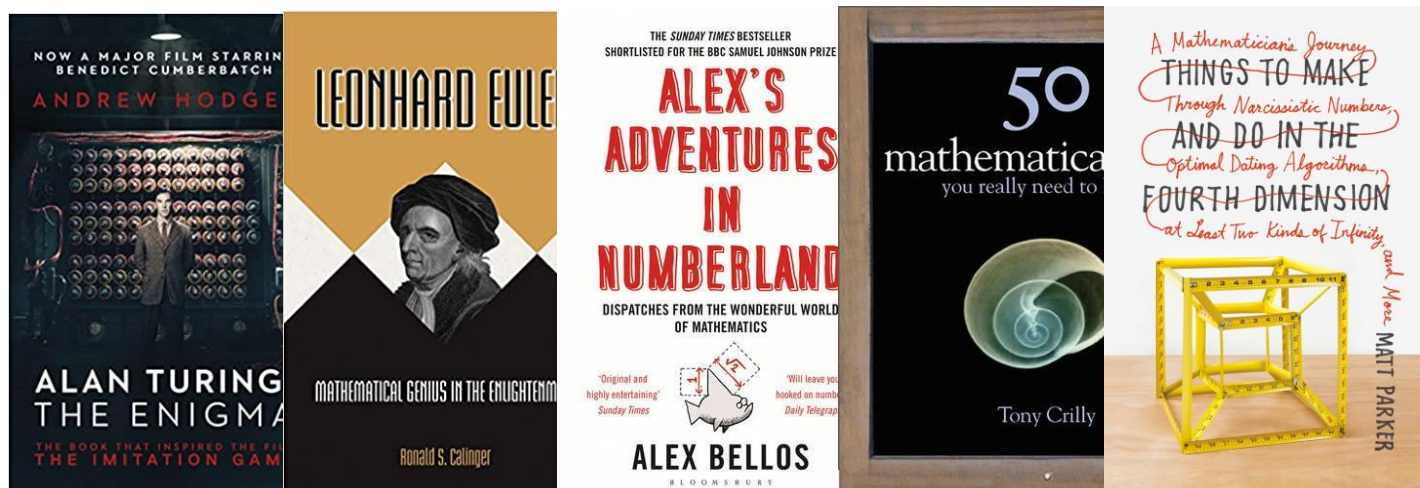
<https://nrich.maths.org/>

<https://www.mathsisfun.com/puzzles/>

<https://www.transum.org/Software/Puzzles/>

<https://simplifytasks.com/2020/01/05/emmas-dilemma-permutations-with-unique-repeating-letters-mathstutorial/>

In addition to this, our recommendations follow below. These texts do not form part of our schemes of work so reading them will not spoil students' enjoyment of future lessons. They will most likely complement the work we do.



Upper School

Alex Bellos

Alex's Adventures in Numberland

Alex Bellos is a gifted writer who has embarked on a mission to popularize mathematics. He makes a frank observation that should give pause to any reader: "By age 16, schoolkids have learned almost no math beyond what was already known in the mid-seventeenth century, and likewise by the time they are 18, they have not gone beyond the mid-eighteenth century." What ensues is both a historical tour and spontaneous encounters with some of the most eccentric people currently operating on the fringes of mathematics.

From its onset, the book is playful. It opens with Chapter Zero rather than the conventional Chapter One. Bellos proceeds with a revelatory anecdote illustrating our own socialized mania for quantification. His overriding theme is that preconceptions shaped by culture and biological hard-wiring are unconsciously embedded in our thinking.

Alex Bellos

Alex Through the Looking-Glass

Once in a great while I run into a book that I want to savour like fine chocolate. Usually I am very much so a speed reader and just zoom through a book. From triangles, rotations and power laws, to fractals, cones and curves, bestselling author Alex Bellos takes you on a journey of mathematical discovery with his signature wit, engaging stories and limitless enthusiasm. As he narrates a series of eye-opening encounters with lively personalities all over the world, Alex demonstrates how

numbers have come to be our friends, are fascinating and extremely accessible, and how they have changed our world. I found myself pausing frequently after sections lost in thought about the material presenting, absorbing the concepts and ideas. I loved it!

Tony Crilly

50 Mathematical Ideas You Really Need to Know

Professor Tony Crilly explains in 50 clear and concise essays the mathematical concepts - ancient and modern, theoretical and practical, everyday and esoteric - that allow us to understand and shape the world around us.

Packed with diagrams, examples and anecdotes, this book is the perfect overview of this often daunting but always essential subject. For once, mathematics couldn't be simpler.

Andrew Hodges

Alan Turing: The Enigma

The official book behind the Academy Award-winning film: *The Imitation Game*, starring Benedict Cumberbatch and Keira Knightley

Alan Turing was the mathematician whose cipher-cracking transformed the Second World War. Taken on by British Intelligence in 1938, as a shy young Cambridge don, he combined brilliant logic with a flair for engineering. In 1940 his machines were breaking the Enigma-enciphered messages of Nazi Germany's air force. He then headed the penetration of the super-secure U-boat communications.

But his vision went far beyond this achievement. Before the war he had invented the concept of the universal machine, and in 1945 he turned this into the first design for a digital computer.

Turing's far-sighted plans for the digital era forged ahead into a vision for Artificial Intelligence.

However, in 1952 his homosexuality rendered him a criminal and he was subjected to humiliating treatment. In 1954, aged 41, Alan Turing took his own life.

Matt Parker

Things to Make and Do in the Fourth Dimension

Maths is a game. This book can be cut, drawn in, folded into shapes and will even take you to the fourth dimension.

So join stand-up mathematician Matt Parker on a journey through narcissistic numbers, optimal dating algorithms, at least two different kinds of infinity and more. Great book. Everyone with a mathematical understanding ranging from 0 to infinity will love the humour, simplicity and amazing facts.

Alex Bellos

Can You Solve My Problems?

A casebook of ingenious, perplexing and totally satisfying puzzles. This book is more about "doing" the maths rather than just reading about it though there is plenty to read about between puzzles. It complements his other books very well.

Martin Gardner

My Best Mathematical and Logic Puzzles

Over a period of 25 years as author of the Mathematical Games column for *Scientific American*, Martin Gardner devoted a column every six months or so to short mathematical problems or puzzles.

Marcus du Sautoy

The Number Mysteries

A Mathematical Odyssey through Everyday Life, a lively book on five mathematical problems that just refuse be solved – and on how many everyday problems can be solved by maths.

Sydney Padua

The Thrilling Adventures of Lovelace and Babbage

In *The Thrilling Adventures of Lovelace and Babbage* Sydney Padua transforms one of the most compelling scientific collaborations into a hilarious set of adventures

National Geographic

The Golden Ratio: The Mathematical Language of Beauty

The world from a mathematical perspective by National Geographic.

Tony Crilly

50 Ideas You Really Need to Know (about maths)

In *50 Maths Ideas You Really Need to Know*, Professor Tony Crilly explains in 50 clear and concise essays the mathematical concepts - ancient and modern, theoretical and practical, every-day and esoteric - that allow us to understand and shape the world around us.

Siobhan Roberts

Genius at Play: The Curious Mind of John Horton Conway

John Horton Conway is a singular mathematician with a lovely loopy brain. He is Archimedes, Mick Jagger, Salvador Dali, and Richard Feynman all rolled into one--he boasts a rock star's charisma, a slyly bent sense of humor, a polymath's promiscuous curiosity, and an insatiable compulsion to explain everything about the world to everyone in it. At Cambridge, Conway wrestled with "Monstrous Moonshine," discovered the aptly named surreal numbers, and invented the cult classic Game of Life--more than just a cool fad, Life demonstrates how simplicity generates complexity and provides an analogy for mathematics and the entire universe. As a "mathemagician" at Princeton, he used ropes, dice, pennies, coat hangers, even the occasional Slinky, as props to extend his winning imagination and share his many nerdish delights. He granted Roberts full access to his idiosyncrasies and intellect both, though not without the occasional grumble: "Oh hell," he'd say. "You're not going to put that in the book. Are you?!?"

M. B. W. Trent

The Prince of Mathematics: Carl Friedrich Gauss

The author narrates the life of Carl Friedrich Gauss, the 18th century mathematician, from his prodigious childhood to his extraordinary achievements that earned him the title 'Prince of Mathematics'. Along the way, the author introduces her young readers to a different culture, the era of small states in Germany where advancement on merits, such as Gauss', was supported by enlightened rulers, competing for intellectual excellence and economic advantage through scientific progress in their small states. Based on extensive research of original and secondary sources, the author has created a historical narrative that will inspire young readers and even curious adults with a story full of human touch and personal achievement.

Ronald S. Calinger

Leonhard Euler: Mathematical Genius in the Enlightenment

This is the first full-scale biography of Leonhard Euler (1707-83), one of the greatest mathematicians and theoretical physicists of all time. In this comprehensive and authoritative account, Ronald Calinger connects the story of Euler's eventful life to the astonishing achievements that place him in the company of Archimedes, Newton, and Gauss. Drawing chiefly on Euler's massive published works and correspondence, which fill more than eighty volumes so far, this biography sets Euler's work in its multi-layered context--personal, intellectual, institutional, political, cultural, religious, and social. It is a story of nearly incessant accomplishment, from Euler's fundamental contributions to almost every area of pure and applied mathematics--especially calculus, number theory, notation, optics, and celestial, rational, and fluid mechanics--to his advancements in shipbuilding, telescopes, ballistics, cartography, chronology, and music theory.

'A child who reads will be an adult who thinks.'

Sasha Salmina (Artist)