

Computer Science Resources for Schools

Resources for students

Key stage	Resource
	Additional Reading
KS 4-5	The Pattern on the Stone: The Simple Ideas That Make Computers Work by Daniel Hillis. ISBN: 978-0465025961 - explains the basic concepts of the computer in everyday language.
KS 4-5	The Information: A History, a Theory, a Flood by James Gleick. ISBN: 978-0007225736 - a chronicle that shows how information has become "the modern era's defining quality - the blood, the fuel, the vital principle of our world."
KS 4-5	Outnumbered: From Facebook and Google to fake news and filter-bubbles – the algorithms that control our lives by David Sumpter. ISBN: 978-1472947413. An applied mathematician takes a look at what algorithms are doing with our data and how they are changing our lives
KS 4-5	Computer Science: An Overview by J. Glenn Brookshear. ISBN: 978-0321544285 - overview of what computer science is all about: each topic is presented with its historical perspective, current state, and future potential, as well as ethical issues.
KS 4-5	AI: Its Nature and Future by Margaret A Boden. ISBN: 978-0198777984. "...reviews the philosophical and technological challenges raised by Artificial Intelligence, considering whether programs could ever be really intelligent, creative or even conscious, and shows how the pursuit of Artificial Intelligence has helped us to appreciate how human and animal minds are possible."
KS 4-5	The Pleasures of Counting by Tom Körner. ISBN: 978-0521568234 - puts Maths into the context of how it is used to solve real-world problems.

KS 4-5	<p>The Code Book by Simon Singh. ISBN: 978-1857028898 - not strictly about Computer Science, but an interesting introduction to code-breaking and cryptography, fields that have a strong connection to Computer Science.</p> <p>Closing the Gap: The Quest to Understand Prime Numbers by Vicky Neale. ISBN: 978-0198788287. Oxford Mathematician Vicky Neale looks at recent progress towards resolving the long-standing Twin Primes Conjecture, including exciting work done as part of huge online collaborations such as the Polymath Projects.</p>
KS 4-5	<p>Algorithmic Puzzles by Anany Levitin and Maria Levitin. ISBN: 978-0199740444 - "...The emphasis lies in training the reader to think algorithmically and develop new puzzle-solving skills: the majority of puzzles are problems where we are asked to find the shortest distance or the fewest moves to get from A to B, or construct a proof that a puzzle has no solution ..."</p>
KS 4-5	<p>Code: The Hidden Language of Computer Hardware and Software by Charles Petzold. ISBN: 978-0735611313 - "What do flashlights, the British invasion, black cats, and seesaws have to do with computers? ...see how ingenuity and our very human compulsion to communicate have driven the technological innovations of the past two centuries."</p>
KS 4-5	<p>Out of Their Minds by D Shasha and Cathy Lazere. ISBN: 978-3540979920 - the lives and discoveries of fifteen unsung computer scientists whose programs have helped people from factory owners to cartoonists.</p>
KS 4-5	<p>Computational Fairy Tales by Jeremy Kubica. ISBN: 978-1477550298 - a romp through the principles of computational thinking, illustrating high-level computer science concepts, the motivation behind them, and their application via the medium of a fairy tale. Aimed at secondary school students. "Bonkers, but very enjoyable."</p>
KS 4-5	<p>Artificial Intelligence: A Ladybird Expert Book by Michael Wooldridge. ISBN: 978-0718188757 Written by our Head of Department, this book "...chronicles the development of intelligent machines, from Turing's dream of machines that think, to today's digital assistants like Siri and Alexa."</p>
KS 4-5	<p>Once Upon an Algorithm: How Stories Explain Computing by Martin Erwig. ISBN: 978-0262036634. Concepts in Computer Science explained through familiar stories such as Hansel and Gretel, Sherlock Holmes, the movie Groundhog Day, and Harry Potter.</p>
	Websites
KS 2-4	<p>Purpose Games - Educational games related to specific subjects and topics.</p>

KS 2-5	<p>Explore.org some of the big questions that are relevant to us all such as;</p> <p>Do aliens exist? Could we live on another planet? Are humans ruining the earth? Is a robot a person? Could you survive a natural disaster? Can time travel ever be possible? Do we see colour the same? Are explosions always destructive?</p>
KS 3-5	<p>Brilliant.org - develop quantitative skills in Maths, Physics and computer science through questions and challenges - free trial then charges may apply.</p>
KS 3-5	<p>Computer Science Unplugged - a Computer Science curriculum for pre-university students developed in New Zealand.</p>
KS 3-5	<p>Oxford Sparks is a portal for engaging with a wealth of exciting science taking place across Oxford University.</p>
KS 5	<p>Staircase 12 - Computer Science</p>
KS 5	<p>Sparknotes - Computer Science a breakdown of sorting, searching, and other fundamentals of computer programming.</p>
KS 5	<p>Oxford Research:</p> <p>Securing the internet of the future</p> <p>Putting out 'Digital Wildfires' before they take hold</p> <p>The friendly face of robots</p> <p>Safety by design</p>

	Computers at the heart of the matter
KS 5	<p>Oxford Research videos:</p> <p>60 Years of Computer Science</p> <p>Oxford and Cybersecurity 1 – the Internet and Policy</p> <p>Oxford and Cybersecurity 2 – Trusted Computing</p> <p>Oxford and Cybersecurity 3 – The Academic Edge</p>
KS 5	My MOOC for Computer Science
KS 5	Computer Science MOOCs and Free Online Courses
KS 5	computersciencezone.org - a list of the top 20 best-rated MOOCs.
KS 5	Computer science courses on edX – Free university-level courses to develop your learning and knowledge.
All	Free, online lectures and courses from Academic Earth . You may find the maths section interesting as well as the Computer Science one.
All	Elizabeth is an automated conversation and natural language processing program that provides an enjoyable introduction to natural language processing, and that can give insights into some of the fundamental methods and issues of artificial intelligence within an entertaining context.
All	Oxford University Computer Science podcasts.
All	Khan Academy Pixar in a Box is a behind-the-scenes look at how Pixar artists do their jobs. You will be able to animate bouncing balls, build a swarm of robots, and make virtual fireworks explode.

All	Game Maker Studio 2 - a game engine and a great gateway to coding, it has a free trial and many tutorial resources.
All	Planet 42 games – Computer Science based educational games.
All	For computer science/ engineering, or anyone interested in learning coding, learning to use Unity (a free game development engine) is very useful and fun.
All	scratch.Edu Create stories, games, and animations Share with others around the world.
All	GeomLab website an introduction to some of the most important ideas in computer programming in an interactive, visual way through a guided activity.
All	Resources suggested by the staff from Bletchley Park.
All	Secret Codes for kids
All	BBC NEWS - Technology updates
All	Code breaking game for schools
ALL	Science Daily - Computer Science News
ALL	Massachusetts Institute of Technology - Computer Science and Technology News
	Mathematical activities useful for Computer Science.
KS 3-5	The United Kingdom Mathematics Trust offers a range of Challenges and Olympiads for UK students, and also publishes books on mathematical problem-solving.

KS 5	The Oxford Mathematics Alphabet - here you will find members of the Oxford Mathematical Institute writing about engaging mathematical ideas and the latest research. Posters will be available for all letters to download and print. Keep checking back to see the next instalment!
KS 5	STEP Support Programme [Note: we don't require our applicants to take STEP, But the STEP Support Programme can help you to develop your problem-solving skills, and that's useful even if you're not taking STEP.]
All	Art of Problem Solving: Resources.
All	NRich Maths.
All	Oxford Mathematics Alphabet. Here you will find members of the Oxford Mathematical Institute writing about engaging mathematical ideas and the latest research. Posters will be available for all letters to download and print. Keep checking back to see the next instalment!
All	Corbett Maths - Computing
Magazines and journals	
KS 4-5	Chalkdust Magazine, written by Maths students at University College London
All	The New Turing Omnibus by A Kee Dewdney. ISBN: 978-0805071665 - mini articles on Computer Science topics.
All	CS4FN (Computer Science for Fun) is a magazine on computer science aimed at school students "Explore how computer science is also about people, solving puzzles, creativity, changing the future and, most of all, having fun." It is printed twice a year and has an associated website with additional articles.
Competitions	
KS 4-5	The United Kingdom Mathematics Trust offers a range of Challenges and Olympiads for UK students, and also publishes books on mathematical problem-solving.

All	The British Informatics Olympiad is a national computer programming competition for British Schools and colleges.
All	The UK Bebras Competition is a problem solving competition for years 2 – 13, with a focus on computational and logical thinking, designed to get students excited about computing and computational thinking. It does not require any preparation and is completed online in schools. Registration takes place through school coordinators.
Events	
KS 3-5	Young Rewired State is a series of collaborative hacking events for under 18s. It brings together young developers to build web and mobile applications that attempt to solve real world problems.
KS 4-5	The Department of Computer Science at Oxford hosts Open Days and events for school-age pupils . These are normally free of charge and range from five-day residential courses to one off Taster Days.

Resources for teachers

Resource	Notes
National Centre for Women and Information Technology.	Female prospective students (and their teachers) might be interested in this organisation, aiming to improve female participation in computing.
Computing At School	A free-to-join association for anyone with an interest in computing in education. Sponsors include Microsoft and Google among others.
Teachcomputing	Alan O'Donohoe is Principal Teacher of ICT at Our Lady's High School, Preston. He has been teaching for just short of 20 years. In the Summer of 2011 he taught himself how to program with Python. He seeks to evangelise teachers to teach computing science through his blogs, tweets and audiobooks .
Scratch Community	A site dedicated specifically to teachers who want to use Scratch to teach programming. Here you will find videos, lesson plans, worksheets, discussions and even real people

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	to ask for help. Unfortunately the webinars are around 1.00 - 2.00 am UK time, but you can watch recordings afterwards.
computerscienceuk.com	A website dedicated to providing computer science teaching resources for teachers of the new Computer Science curriculum for the KS3, GCSE and A-Level curriculums.
CS Unplugged	A collection of free teaching material that teaches Computer Science through engaging games and puzzles.