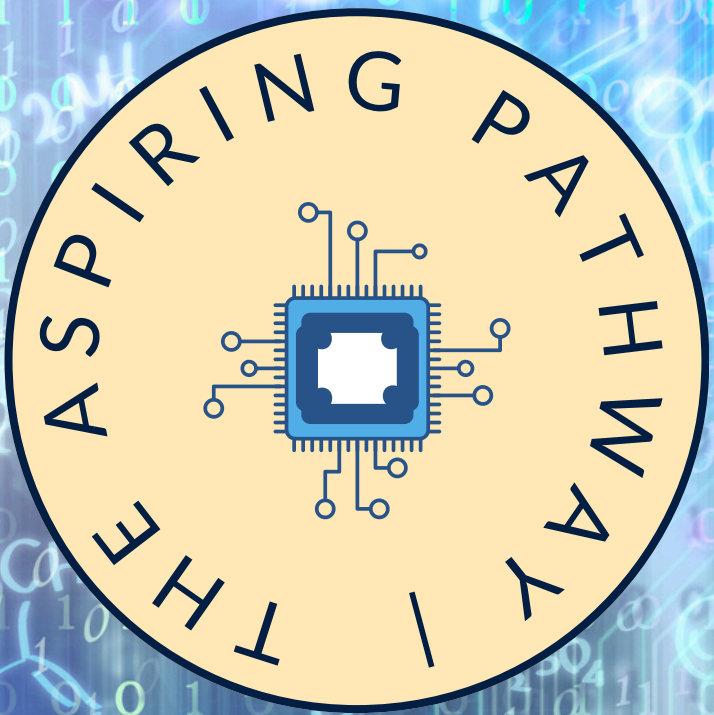
‘The Aspiring Computer Scientist.’ KS4/5

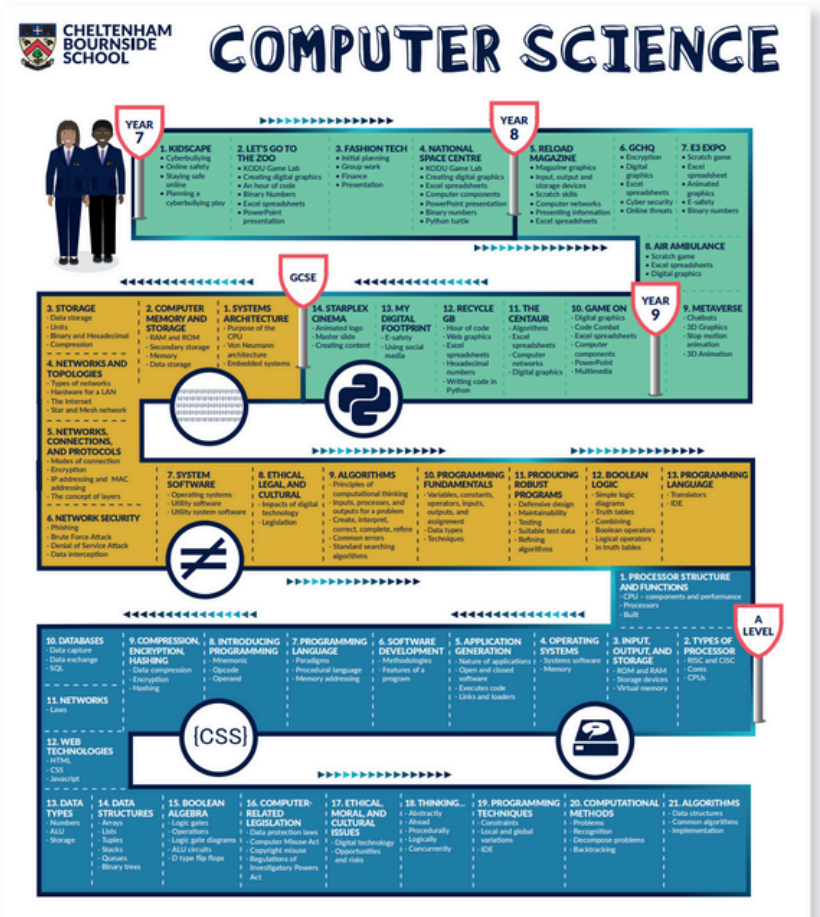
CyberFirst GOLD AWARD SCHOOL



CHELTENHAM BOURNSIDE SCHOOL

Inspiring lives through learning

‘The Aspiring Computer Scientist’



‘The Aspiring Computer Scientist’

If you're passionate about cyber, technology, problem-solving, or building things that make a difference, I strongly encourage you to get involved in our Aspiring Computer Scientist Pathway.

Whether your interests lie in game development, coding, cybersecurity, data science, AI, or web development, this pathway will help you explore real-world applications and develop skills that employers and universities really value.

As well as strong academic foundations and relevant qualifications, universities and employers are looking for applicants that can demonstrate a real enthusiasm for computer science beyond the classroom.

Completing this pathway will equip you with the evidence they are looking for by:

- Reading around the subject
- Listening to podcasts and watching relevant films and TV documentaries
- Following experts and keeping up to date with advances in technology on social media
- Participating in competitions
- Independently learning how to program in different languages and present examples of the code you have written
- Undertaking computing/cyber-related work experience

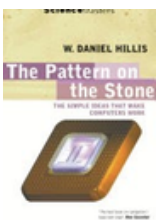
Please come and speak to a member of the Computing team if you would like more information on completing the KS4/5 Aspiring Computer Scientist Pathway.

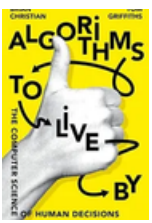
Good luck!

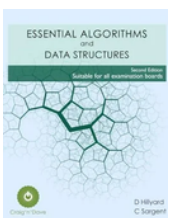
Mr Hunt
Head of Computing

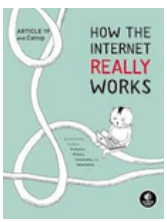
Reading list

- **Code: The Hidden Language of Computer Hardware and Software** - *Charles Petzold*
- **The Pattern On The Stone** – *W. Daniel Hillis*
- **Algorithms to Live By** – *Brian Christian & Tom Griffiths*
- **Essential Algorithms and Data Structures** - *D Hillyard and C Sargent*
- **The Innovators** - *Walter Isaacson*
- **Computer Science: An Overview** - *J. Glenn Brookshear*
- **Grokking Algorithms: An Illustrated Guide for Programmers and Other Curious People** - *Aditya Bhargava*
- **Inside the Machine: An Illustrated Introduction to Microprocessors and Computer Architecture** - *Jon Stokes*
- **How the Internet Really Works: An Illustrated Guide** - *Article 19*
- **Logic and Computer Design Fundamentals** - *M. Morris Mano & Charles R. Kime*









Competitions

The Alan Turing Cryptography Competition

The Alan Turing Cryptography Competition

Do you like breaking codes and solving ciphers? This competition is aimed at secondary school children in the UK up to Year 11. You don't need to be a computer whizz or a mathematical genius — you just need to keep your wits about you and be good at solving problems! The competition is organised by the Department of Mathematics at the University of Manchester.

BAFTA Young Game Designers

Inspiring and celebrating the next generation of game designers.

Want to kick start your career in games? This is the place for you. Every year BAFTA runs the Young Game Designers competition to inspire those who are passionate about games. Creating a space for imaginations to thrive, it's a chance for 10–18-year-olds to design, develop and present new game ideas to the world.

Isaac Computer Science

Isaac Computer Science's National Computer Science Competition

Calling all computer science fans! Isaac Computer Science, ran by the National Centre for Computing Education (NCCE), hosts a national competition that challenges you to imagine, design, and pitch a groundbreaking new product for the Internet of Everything. The competition is a fantastic opportunity for you to apply your knowledge to real-world ideas..

Competitions

The UK Bebras Challenge

The Bebras Challenge introduces computational thinking to students worldwide. This exciting challenge takes place in schools, under the supervision of teachers, over a two-week period every November. In the UK, the challenge is open to all young people aged up to 19. Each participant has 45 minutes to tackle a series of interactive tasks, designed to encourage logical thinking and problem-solving skills appropriate for their age group.

The NCSC provide short courses designed to introduce the younger generation to the world of cyber security.

For 14 - 17 year olds, these courses are called:

- CyberFirst Defenders
- CyberFirst Futures
- CyberFirst Advanced

Listen and Watch

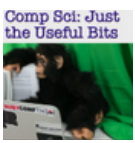
Podcasts

Spark with Nora Young
Nora Young helps you navigate your digital life by connecting you to fresh ideas in surprising ways.

Programming Throwdown
Educates Computer Scientists and Software Engineers on a cavalcade of programming and tech topics. Every show will cover a new programming language, so listeners will be able to speak intelligently about any programming language.

Coding 101
A weekly instructional, project-oriented programming show with appeal for beginning to intermediate programmers.

How AI Happens
How AI Happens features experts and practitioners explaining their work at the cutting edge of Artificial Intelligence. Tune in to hear AI Researchers, Data Scientists, ML Engineers, and the leaders of today's most exciting AI companies explain the newest and most challenging facets of their field.



Comp Sci: Just the useful bits
Every week you'll get an informed opinion from a professional developer about a specific part of computer science.

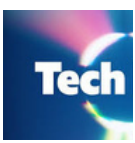
Listen and Watch

Films/YouTube/TV

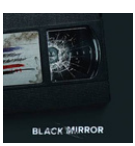
The Imitation Game
During the Second World War, mathematician Alan Turing and his team of cryptographers set out to decipher the German Enigma code. (Film)

The Social Network
Harvard sophomore Mark Zuckerberg pursues an idea that propels him to internet success, bringing in legal trouble and costing him friendships. (Film)

Jobs
After revolutionizing the home computer, Steve Jobs and his friend Steve Wozniak jointly launch Apple Inc. But as a leader and a visionary, Jobs' rocky tenure leads to his ouster from the company. (Film)



Tech Now
Tech Now explores the latest innovation and technology shaping our lives. Bringing you the inside track on global trends and advancements happening in the tech space today. (BBC iPlayer)



Black Mirror
In an abstrusely dystopian future, several individuals grapple with the manipulative effects of cutting edge technology in their personal lives and behaviours. (Netflix)

Listen and Watch

Social media

@BCS - The British Computer Society The Chartered Institute for IT, The professional body behind The people behind our amazing digital world.

@craigndave - Craig and Dave (former Bournside teacher, Dave Hillyard) have been experienced practitioners of Computer Science in England since 1997. Ideal for subject knowledge enhancement or flipped classroom teaching, the course videos allow students to be prepared ahead of their lesson by learning the subject content at home.

@computerphile - YouTube videos about computers and the internet and stuff. Sister project to **@numberphile.**

@freecodecamp - FreeCodeCamp is a community of people from all around the world who are learning to code together.

@thecoderguy - Here you will find lots of coding and programming tutorials related to many programming languages like Python, HTML, CSS, JavaScript, and much more...

@theprimeagen - The online alias of Michael B. Paulson, a software engineer and popular streamer known for his content on software development, Vim/NeoVim, and his time working at Netflix.

@compscifact - An X account that posts daily facts about computer science, created by John D. Cook. The account, which joined Twitter in November 2010, aims to share interesting and educational tidbits related to the field.

@techtok7 - Daily logic developing tasks and tricks you can use to improve your programming knowledge.

Work Experience and Events

There are many exciting and valuable work experience opportunities available within the digital and IT sector. These placements provide a unique chance to step outside the classroom and see how your skills apply in the real world.

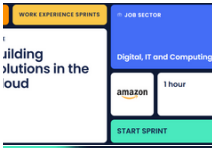
Gaining work experience in a computing-related environment offers:

- **Practical skills** – You'll learn how IT tools, software, and systems are used in everyday business operations.
- **Career insight** – Experience helps you discover which areas of IT (e.g. cybersecurity, data analysis, development) interest you most.
- **Confidence and communication** – Working with professionals improves your confidence and soft skills like teamwork, problem solving and communication.
- **Employability** – Real-world experience stands out on your CV and strengthens university or apprenticeship applications.

There are many different types of businesses and organisations that offer meaningful computing-related experience. These include:

- IT support companies
- Software or app development firms
- Web design and digital media agencies
- Cybersecurity companies
- Game development studios.
- E-commerce companies
- Finance and insurance organisations
- Engineering and manufacturing firms
- Public sector departments and local councils
- Marketing agencies
- School IT Support

Work Experience and Events



Building Solutions in the Cloud | Springpod
Tackle real challenges in cloud computing — Amazon style.

Technology Work Experience | Success at School Join Terry Richards in this captivating Subject Spotlight as he explores the world of cybersecurity.

Why technology work experience matters – and where to find it Whether you're interested in developing the next big app or want to use YouTube to market new products, technology work experience is important.

Next Tech Girls | Work Experience Discover what a future in tech could look like with hands-on, week-long placements at leading companies across the UK.

Fujitsu: Cybersecurity In this Cybersecurity Sprint with Fujitsu, you'll put your problem-solving skills to the test! You'll take on the role of a Cybersecurity Specialist.

Step into the world of work and join Renishaw for a work experience week. In the software scheme you will:

- Develop a programme as part of a software team
- Learn coding and network communication skills
- Design and test your software against a brief
- Plan and achieve your goals using AGILE techniques

inspire breakfast lectures

The Careers Team at Bournside deliver regular Inspire Breakfast Lectures. Open to students in Year 10 - 13, these business-focused breakfasts invite speakers from all corners of industry to share their professional experiences and valuable insights with Bournside students over breakfast; opening our eyes to the opportunities available across many industry sectors.

Take a look at upcoming speakers and reserve your space here.