The Totteridge Academy
The best in everyone™
Part of United Learning

Subject: Computer Science

AIM AND PURPOSE

Computing at TTA aims to prepare students to become fluent in a variety of digital skills. These skills are becoming increasingly valued and important to a wide range of careers, and in some instances are at a critical shortage (DCMS, 2019). The transformation that digital technology has brought and is still yet to bring will have an enormous effect on everyone's lives (Royal Society, 2016). The purpose of the TTA Computing Curriculum is to equip students with the tools to harness technology, using it to solve problems and to keep up with the changes that are taking place with technology in society every day. Every student should have the opportunity to navigate these technological changes safely, effectively, and be well-informed of the opportunities available to them to become effective digital citizens.

HOW DOES THE CURRICULUM INDUCT STUDENTS INTO THE DISCIPLINE OF THE SUBJECT?

The curriculum at TTA is designed to provide students with a comprehensive introduction to the field of computer science. The curriculum is structured in such a way that students are gradually exposed to the fundamental concepts and skills required to be successful in the discipline. This is achieved through a series of engaging and interactive lessons that are designed to be both accessible and challenging. In addition to core computer science topics, the curriculum also covers a range of related subjects, such as digital literacy and computational thinking, to provide students with a well-rounded understanding of the field. Moreover, the curriculum also includes a range of practical activities and project-based learning opportunities, which help to bring the theory to life and provide students with hands-on experience in real-world applications of computer science. Through these experiences, students can develop their problem-solving skills, creativity, and ability to think critically about complex issues.

Computer science not only provides students with valuable technical skills, but it also helps to develop their critical thinking, problem-solving, and communication skills, all of which are transferable to many other fields and careers (The Royal Society, 2016). This approach to induction helps to provide students with the knowledge and skills they need to succeed in a rapidly changing digital world, both within and beyond the discipline of computer science.

Subject: Computer Science
Year 7

OVERVIEW

Computing aims to ensure that all pupils: can understand and apply the fundamental principles and concepts of computer; science, including abstraction, logic, algorithms and data representation; can analyse problems in computational terms, and have repeated practical experience; of writing computer programs in order to solve such problems ; can evaluate and apply information technology, including new or unfamiliar; technologies, analytically to solve problems; are responsible, competent, confident and creative users of information and communication technology .

Term	Focus	Assessment
Aut 1	*Introduction to computer science and Information Technology* • *Introduction to the school network, how to create files and folder structure and save work on to the school network appropriately.* • *Learn how to effectively use software such as WORD and PowerPoint* • *Understand a range of ways to use technology safely, respectfully, responsibly and securely.* • *Learn how to recognise threats when using the internet such as phishing and online grooming.* • *To learn what 'fake news' is and the skills and techniques to distinguish between what's false or fake and what's real so that they can use the internet safely and make informed decisions.*	Ongoing assessment through class tasks
Aut 2		Ongoing class assessment of tasks
Spr 1	• *Introduction to modelling using Spreadsheet Software* • *Understand how spreadsheets can be used to store data and information.* • *Learn cell referencing, cell ranges and writing a formula to perform mathematical calculations.* • *Learn how to format spreadsheets to present information in way that is easy to view and comprehend.* • *Learn how to use formulae to perform complex calculations on data in a spreadsheet.* • *Learn how to use functions such as MAX, MIN, AVERAGE, COUNT to perform complex calculations on data in a spreadsheet.*	Ongoing assessment through class tasks and mid-year assessment
Spr 2		Ongoing class assessment of tasks
Sum 1	• *Introduction to Programming using Scratch* • *Learn the concept of sequence, selection and iteration in programming* • *Applying sequence, selection and iteration in Scratch* • *Learn how to implement movements to various sprites using various keystrokes.* • *Learn how to create and use variables in Scratch to keep score of a game or count lives in a game.* • *End of year exams and Feedback*	Ongoing assessment through class tasks
Sum 2		Ongoing class assessment of tasks and end of year assessment

Home Learning:

- Homework set every lesson using Carousel Learning

Useful resources:

- BBC Bitesize Computing
- Scratch online

The Totteridge Academy

The best in everyone™

Part of United Learning

Subject: Computer Science Year 8

OVERVIEW

Computing aims to ensure that all pupils:

- understand and apply the fundamental principles and concepts of computer; science, including abstraction, logic, algorithms and data representation;
- can analyse problems in computational terms, and have practical experience; of writing computer programs;
- evaluate and apply technology, including new or unfamiliar; technologies, analytically to solve problems; and
- are responsible, competent, confident and creative users of information and communication technology.

Term	Focus	Assessment
Aut 1	*Binary number systems* • *To understand how binary computers interpret numbers.* • *To be able to convert numbers between number bases (denary/decimal, binary and hexadecimal).* • *To be able to add up to three 8bit binary numbers and to understand common errors that happen when computers complete these.* • *To know why we use binary and hexadecimal numbers systems in Computer Science* *Boolean Logic.* • *To understand how binary is used to represent logic.* • *To be able to evaluate logical statements, involving AND, OR, NOT and XOR operators.* • *Complete logic circuits and truth tables.* • *To design logic circuits to solve real world problems.*	Ongoing assessment through class tasks, end of unit test and homework
Aut 2		
Spr 1	*Python Programming* *Introduction to Python programming through manipulation of Karel the dog (like Turtle) to see a visual representation of the output of students' computer programs.* • *To understand how algorithms can be used to define how to solve a problem and computer programs are used to instruct a computer how to solve a problem.* • *To understand how to use the Integrated Development Environment and to solve errors using the debugging tools in Code HS.* • *sequences; selection; counter controlled iteration conditional iteration and modular program design can be used to make maintainable computer code.*	Ongoing assessment through class tasks, end of unit test and homework. Mid-Year assessment of all Year 7 and 8 content
Spr 2		
Sum 1	*Hardware; software and data representation* • *To learn the stages of the Fetch Decode Execute cycle(FDE).* • *To learn the components involved in and their roles in the FDE.* • *To learn the role of and need for storage, input & output hardware devices.* • *To be able to explain the use of storage, input & output hardware devices in given situations* • *To be explain how a computer represents images, sound and audio using binary.*	Ongoing assessment through class tasks, end of unit test and homework. End of Year assessment of all Year 7 and 8 content
Sum 2		

Home Learning:

- Homework set every lesson using Carousel Learning

Useful resources:

- BBC Bitesize Computing
- CodeHS.com for programming

Subject: Computer Science
Year 9

OVERVIEW

Computing aims to ensure that all pupils:

- understand and apply the fundamental principles and concepts of computer; science, including abstraction, logic, algorithms and data representation;
- can analyse problems in computational terms, and have practical experience; of writing computer programs;
- evaluate and apply technology, including new or unfamiliar; technologies, analytically to solve problems; and
- are responsible, competent, confident and creative users of information and communication technology.

Term	Focus	Assessment
Aut 1 Aut 2	*Binary number systems* • *To understand how binary computers interpret numbers.* • *To be able to convert numbers between number bases (denary/decimal, binary and hexadecimal).* • *To be able to add up to three 8bit binary numbers and to understand common errors that happen when computers complete these.* • *To know why we use binary and hexadecimal numbers systems in Computer Science* *Boolean Logic.* • *To understand how binary is used to represent logic.* • *To be able to evaluate logical statements, involving AND, OR, NOT and XOR operators.* • *Complete logic circuits and truth tables.* • *To design logic circuits to solve real world problems.*	Ongoing assessment through class tasks, end of unit test and homework
Spr 1 Spr 2	*Python Programming* *Introduction to Python programming through manipulation of Karel the dog (like Turtle) to see a visual representation of the output of students' computer programs.* • *To understand how algorithms can be used to define how to solve a problem and computer programs are used to instruct a computer how to solve a problem.* • *To understand how to use the Integrated Development Environment and to solve errors using the debugging tools in Code HS.* • *sequences; selection; counter controlled iteration conditional iteration and modular program design can be used to make maintainable computer code.*	Ongoing assessment through class tasks, end of unit test and homework. Mid-Year assessment of all Year 8 and 9 content
Sum 1 Sum 2	*Hardware; software and data representation* • *To learn the stages of the Fetch Decode Execute cycle(FDE).* • *To learn the components involved in and their roles in the FDE.* • *To learn the role of and need for storage, input & output hardware devices.* • *To be able to explain the use of storage, input & output hardware devices in given situations* • *To be explain how a computer represents images, sound and audio using binary.*	Ongoing assessment through class tasks, end of unit test and homework. End of Year assessment of all Year 8 and 9 content

Home Learning:

- Homework set every lesson using Microsoft Forms or Carousel learning

Useful resources:

- BBC Bitesize Computing
- Code.org for programming

The Totteridge Academy
The best in everyone™
Part of United Learning

Subject: Computer Science
Year: 10

OVERVIEW

Computer Science will encourage learners to understand and apply the fundamental principles and concepts of Computer Science, including abstraction, decomposition, logic, algorithms, and data representation; analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs; understand the components that make up digital systems, and how they communicate with one another and with other systems; and understand the impacts of digital technology to the individual and to wider society.

Term	Focus	Assessment
Aut 1	• Data representation intro to numbers and formats • System Architecture • Introduction to Programming Techniques	Ongoing assessment through class tasks
Aut 2	• System Architecture • Storage • Introduction to Programming Techniques	Ongoing assessment through class tasks.
Spr 1	• Wired & Wireless Networks • Network Topologies, protocols • Producing Robust programs	Ongoing assessment through class tasks. Mid year assessment
Spr 2	• System Security • Producing Robust programs • Computational Logic	Ongoing assessment through class tasks..
Sum 1	• System Software • Data representation intro to numbers and formats • Translators and facilities of language	Ongoing assessment through class tasks
Sum 2	• Data storage and compression • Ethical, legal, cultural and environmental concerns • Internet and WWW	Ongoing assessment through class tasks. End of year paper

Home Learning:
- Weekly exam questions.

Useful resources:
- AQA GCSE (9-1) Computer Science textbook.
- Seneca Learning. Codecademy (for learning Python)

The Totteridge Academy
The best in everyone™
Part of United Learning

Subject: Computer Science
Year: 11

OVERVIEW

Computer Science will encourage learners to understand and apply the fundamental principles and concepts of Computer Science, including abstraction, decomposition, logic, algorithms, and data representation; analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs; understand the components that make up digital systems, and how they communicate with one another and with other systems; and understand the impacts of digital technology to the individual and to wider society.

Term	Focus	Assessment
Aut 1	• Compression • Programming structures	Ongoing assessment through class tasks
Aut 2	• Standard algorithms • Hand tracing Algorithms	Ongoing assessment through class tasks. Mock exams.
Spr 1	• Database design • Revision	Ongoing assessment through class tasks
Spr 2	• Revision	Ongoing assessment through class tasks. Mock exams.
Sum 1	• Revision	
Sum 2		

Home Learning:

- Weekly exam questions.

Useful resources:

- AQA GCSE (9-1) Computer Science textbook.
- Seneca Learning. Codecademy (for learning Python)