

The Computing Curriculum

At Tupton Hall School the Computing curriculum is mapped across five years and developed across the Redhill Academy Trust. We deliver schemes of work that are scaffolded at a detailed level to ensure that we tailor all learning to a pupil's individual needs. There are three main pillars in Computing: Computer Science, information technology and digital literacy. It is an expectation that students will interconnect these pillars and in doing so acquire knowledge, both from a declarative and procedural element, through our Computing curriculum that allows them to develop for the next steps in a Computing career. We aim to provide a selection of contexts in which student learning is engaging and relevant to young people whilst also interconnecting the pillars of Computing to ensure they gain a better understanding of Computing use in real-life situations. We also ensure that all students receive opportunities to participate in curriculum enrichment activities at appropriate points, enhancing their Computing learning experience. The more adept students can participate in national Computing competitions, develop their understanding of Computing, and celebrate their successes.

The Computing curriculum offered at Tupton Hall School is a challenging one, which is tailored using the National Curriculum as a reference to offering breadth. During secondary school education, students will be taught the foundations of Computer Science, including computational thinking, programming and data representation. The challenge for students is to analyse problems and use practical programming software in order to solve them. In turn, allowing students to become competent, confident and creative users of information and communication technology.

The application of Computing will allow students to undertake creative projects that involve making decisions on an approach to achieve challenging goals. This could be across a range of different software and devices which strengthens transferable skills needed for the future. Computing ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Technology is constantly evolving and we have the responsibility at Tupton Hall School to provide all young people with the knowledge, application and experience to be adaptable throughout technological changes in their future.

Co-curricular

The Computing curriculum offers various co-curricular offerings, including regular Computing lunch and after school clubs, remaining inclusive to all year groups to support any Computing development they need. We also run a series of competitions and workshops that are accessed online to allow students to gain new experiences and awareness of the impact of Technology in society.

Curriculum Intent

The Computing area within Technology at Tupton Hall School aims to provide a Computing curriculum that is challenging, accessible and engaging for all. Ensuring that all pupils studying Computing become digitally literate, develop ideas using technology for future needs as part of their holistic application to life in the 21st century. We have reviewed the National Curriculum and produced a learning journey that intends to sequence through topics that builds upon prior knowledge and challenge students to make progress to qualifications at KS4, KS5 and beyond school life. Pupils will revisit content throughout the curriculum to ensure the breadth of Computing knowledge covered is deepened.

Curriculum Implementation

Computing curriculum works to develop a computational approach to solving problems within a classroom making use of programming software and learning languages that give students transferable skills. Lessons will contain interleaving content at the start as part of memory recall strategy to support student learning of key knowledge. The underpinning theory that links to GCSE Computer Science is content that is delivered from KS3 to ensure students learning journeys are transparent. Further opportunities to enrich students' knowledge come through 'Hour of Code' events and co-curricular clubs such as Monday Megabytes. Online platforms are very much at the heart of the vehicle in student learning with the key being accessibility not only within the classroom but from any device and anywhere.

Subject	Computing (Foundation)	Year Group:	7 (Foundation)	
Unit/Topic	E-safety and communication	Programming using Scratch	Binary numbers and storage	Algorithms
Skills	Information technology skill, specifically Microsoft office skills. Digital literacy skills, specifically e-safety skills.	Programming skills.	Computer Science, information technology and web browsing skills.	Computational thinking skills.
Knowledge <ul style="list-style-type: none"> Declarative: 'Knowing that' – facts/concepts. Procedural: 'Knowing how' – methods/processes 	Declarative e.g. layout of a letter and procedural e.g. how to: login, send an e-mail, word process a letter, and create a PowerPoint and spreadsheet. Declarative e.g. knowing social engineering techniques and procedural e.g. how to search the internet safely.	Declarative e.g. what is a variable and procedural e.g. how to create a variable in programming software.	Declarative e.g. What is a binary and procedural e.g. Binary conversion.	Declarative e.g. what is Algorithmic thinking, pattern recognition, decomposition, abstraction. Procedural e.g. create algorithms to solve problems.
Recall/review from previous learning	Key terminology e.g. e-mail, attachment etc. What does a phishing e-mail look like? How do we know?	Key terminology and application e.g. what is a variable? How do you create a variable and display the output in programming software?	Key terminology and application e.g. How do you convert a binary number into denary?	Key terminology e.g. How did we get Scratch programs to work?
Assessment <ul style="list-style-type: none"> Formative assessment Summative assessment 	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.
Cultural Capital, Equality, Diversity Inclusion	Digital divide, careers for girls in IT. Digital divide, fake news and careers for girls in IT.	Careers for girls in Computing. Ada Lovelace reference to debugging	Careers for girls in Computing.	Ada Lovelace reference to debugging. Example algorithms refer to female contexts as well as male.
Literacy/Numeracy	Literacy – writing for audience and purpose. SPAG identification of phishing e-mails Numeracy – spreadsheet calculations. Statistics.	Literacy – Describe/Explain tasks. Numeracy – calculations in statements.	Literacy – Describe/Explain tasks. Numeracy – binary conversions.	Literacy – Describe/Explain tasks. Numeracy – calculations in process and output boxes.

Subject	Computing			Year Group:	7	
Unit/Topic	Office 365	Web Awareness	Under the hood	Programming with Scratch	Physical Computing with Microbit	Digital Graphics
Skills	Information technology skill, specifically Microsoft office skills. Digital literacy skills, specifically e-safety skills.	Theory based unit looking at key network knowledge and network threats and preventions.	Computer Science, information technology and web browsing skills.	Programming skills.	Programming skills. IDE skills.	Practical unit looking at what makes images and practical side of manipulating images for different purposes.
Knowledge <ul style="list-style-type: none"> Declarative: 'Knowing that' – facts/concepts. Procedural: 'Knowing how' – methods/processes 	Declarative e.g. layout of a letter and procedural e.g. how to: login, send an e-mail, word process a letter, create a PowerPoint and spreadsheet.	Declarative e.g. phishing, pharming, virus etc. Procedural e.g. how to create a informative document.	Declarative e.g. What is a CPU and procedural e.g. Binary conversion.	Declarative e.g. what is a variable and procedural e.g. how to create a variable in programming software.	Declarative e.g. what is a circuit board and procedural e.g. how to program the Micro:bit.	Declarative e.g. what is a bit map image procedural e.g. how to create and image for a specific purpose.
Recall/review from previous learning	Key terminology e.g. e-mail, attachment etc.	Key terminology e.g. spam, scam, copyright, hacking etc.	Key terminology and application e.g. what does the CPU stand for? How does it work? How do you convert a binary number into denary?	Key terminology and application e.g. what is a variable? How do you create a variable and display the output in programming software?	Key terminology and application e.g. what is a Micro:bit? Can you describe it? How do you program it?	Key terminology e.g. vectors, 3-D modelling etc.
Assessment <ul style="list-style-type: none"> Formative assessment Summative assessment 	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – Big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.
Cultural Capital, Equality, Diversity Inclusion	Digital divide, careers for girls in IT.	Showing respect when using the internet – preventing cyber crime.	Careers for girls in Computing.	Careers for girls in Computing.	Careers for girls in Computing.	Image manipulation to change opinion, influence of AI.
Literacy/Numeracy	Literacy – writing for audience and purpose. Numeracy – spreadsheet calculations.	Literacy – writing to inform. Numeracy – N/A	Literacy – Describe/Explain tasks. Numeracy – binary conversions.	Literacy – Describe/Explain tasks. Numeracy – calculations in statements.	Literacy – Big write Numeracy – calculations in statements.	Literacy – use of keyword and articles that represent images. Numeracy – file size etc.

Subject	Computing		Year Group:	8		
Unit/Topic	MakeCode Arcade	Flowol	AppLab	Data Representation	Python (EduBlocks)	Networks
Skills	Independent skills.	Computational thinking, problem solving skills.	Design, programming, testing and evaluation skills.	Unit conversions. Calculating values.	Programming skills.	Computer Science, information technology and web browsing skills.
Knowledge <ul style="list-style-type: none"> Declarative: ‘Knowing that’ – facts/concepts. Procedural: ‘Knowing how’ – methods/processes 	Declarative e.g. what is the IDE of Make Code Arcade Procedural e.g. how do we use it.	Declarative e.g. What is computational thinking Procedural e.g. how to apply computational thinking techniques to solve problems.	Declarative e.g. impact of design choices. Procedural e.g. How to design an app?	Declarative e.g. what is a denary value in binary Procedural e.g. how do we convert a denary value into binary	Declarative e.g. what is a variable and procedural e.g. how to create a variable in programming software	Declarative e.g. what is a network? Procedural e.g. What factors affect the performance of networks?
Recall/review from previous learning	Key terminology and application e.g.	Key terminology and application e.g. computational thinking skills are linked to this unit.	Key terminology and application e.g. input, output, sequence, audience, purpose. Previous learning in all Y7 topics links to this unit.	Key terminology and application e.g. bit, byte, denary, binary, hexadecimal.	Key terminology and application e.g. what is a variable? How do you create a variable and display the output in programming software?	Key terminology and application e.g. what is a network?
Assessment <ul style="list-style-type: none"> Formative assessment Summative assessment 	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.
Cultural Capital, Equality, Diversity Inclusion	Awareness of testing importance when programming. Agile model.	Careers for girls in Computing.	Careers for girls in Computing. Other career opportunities.	Careers beyond programmers.	Careers for girls in Computing.	Careers for girls in Computing.
Literacy/Numeracy	Literacy – reading tutorials/instructions. Numeracy – calculating sprite values.	Literacy – decomposing written problems. Numeracy – computational thinking tasks.	Literacy – Describe/Explain tasks. Numeracy – dimensions of assets calculated.	Literacy – N/A Numeracy – number conversions and systems.	Literacy – Describe/Explain tasks. Numeracy – calculations in statements.	Literacy – Describe/Explain tasks. Numeracy – shortest path between routers..

Subject	Computing	Year Group:	9	
Unit/Topic	Programming fundamentals		Programming challenges	
Skills	Programming skills.			
Knowledge <ul style="list-style-type: none"> • Declarative: 'Knowing that' – facts/concepts. • Procedural: 'Knowing how' – methods/processes 	Declarative e.g. what are do efficient programs look like? Procedural e.g. how do we apply programming constructs to solve problems?	Declarative e.g. what programming constructs are needed and procedural e.g. implementation of success criteria.		
Recall/review from previous learning	Key terminology and application e.g. Programming with Scratch, Microbit, Python.		Key terminology and application e.g. continuation of Python knowledge from previous lesson. Application of skills.	
Assessment <ul style="list-style-type: none"> • Formative assessment • Summative assessment 	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.		Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	
Cultural Capital, Equality, Diversity Inclusion	Careers for girls in Computing. Other career opportunities.		Careers for girls in Computing. Other career opportunities.	
Literacy/Numeracy	Literacy – Describe/Explain tasks. Numeracy – calculations in statements.		Literacy – Describe/Explain tasks. Numeracy – calculations in statements.	

Subject	GCSE Computer Science		Year Group:	10		
Unit/Topic	1.3.1 Networks and topologies. 1.3.2 Wired and wireless networks, protocols and layers 2.3.1 Defensive Design. 2.3.2 Testing.	1.4.1 Threats to computer systems and networks. 1.4.2 Identifying and preventing vulnerabilities. 2.5.1 Languages. 2.5.2 IDE.	1.5.1 Operating systems. 1.5.2 Utility software. 1.2.4 Numbers, Characters, Images, Sound. 1.2.5 Compression.	2.1.3 Searching and sorting algorithms. 2.2.3 Additional programming techniques.	2.2.3 Additional programming techniques.	Programming project.
Skills	Computing skills.	Computing and programming skills.	Computing skills.	Computational thinking and programming skills.	Programming skills.	Computational thinking and programming skills.
Knowledge <ul style="list-style-type: none"> Declarative: 'Knowing that' – facts/concepts. Procedural: 'Knowing how' – methods/processes 	Declarative e.g. what are network topologies. procedural e.g. why set up a network in a certain topology?	Declarative e.g. What different types of language exist? procedural e.g. how does machine instructions relate to high level languages?	Declarative e.g. what functions of a computer occur? procedural e.g. how do functions impact on a computers performance?	Declarative e.g. what are the different searching algorithms? procedural e.g. how do the different searching algorithms work? When would you use them?	Declarative e.g. What is an array? procedural e.g. how would you solve problems using arrays?	Declarative e.g. What does a programming project consist of? procedural e.g. how can you complete an analysis, design etc.
Recall/review from previous learning	Key terminology and application e.g. Networks in Y8.	Key terminology and application e.g. Network threats.	Key terminology and application e.g. Under the hood (Y7), data representation (Y9).	Key terminology and application e.g. Python programming.	Key terminology and application e.g. Python programming.	Key terminology and application e.g. Python programming.
Assessment <ul style="list-style-type: none"> Formative assessment Summative assessment 	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test, big write tasks.
Cultural Capital, Equality, Diversity Inclusion	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.
Literacy/Numeracy	Literacy – Describe/Explain tasks.	Literacy – Describe/Explain tasks.	Literacy – Describe/Explain tasks. Numeracy – binary conversions.	Literacy – decomposing written problems. Numeracy – computational thinking tasks.	Literacy – Describe/Explain tasks. Numeracy – calculations in statements.	Literacy – Describe/Explain tasks. Numeracy – calculations in statements.

Subject	GCSE Computer Science		Year Group:	11	
Unit/Topic	1.2.4 Data storage 1.2.5 Compression 2.2.1 Programming fundamentals	2.2.3 Additional programming techniques	1.5 System software	Exam revision	Exam revision
Skills	Computing and programming skills.	Programming skills.	Computing skills.	Computing and programming skills.	Computing and programming skills.
Knowledge <ul style="list-style-type: none"> Declarative: 'Knowing that' – facts/concepts. Procedural: 'Knowing how' – methods/processes 	Declarative e.g. what are the units of storage? Procedural e.g. how to calculate various memory sizes for different purposes.	Declarative e.g. what is an array, file handling, string manipulation techniques, SQL etc. Procedural e.g. how to create an array and apply string manipulation techniques.	Declarative e.g. Identification of different functions within an operating system. Procedural e.g. describing how each function works.	Declarative e.g. know all the keywords within both J277/01 and J277/02 Procedural e.g. Applying key concepts in various exam scenarios e.g. designing a flowchart based on some code given.	Declarative e.g. know all the keywords within both J277/01 and J277/02 Procedural e.g. Applying key concepts in various exam scenarios e.g. designing a flowchart based on some code given.
Recall/review from previous learning	Key terminology and application e.g. Binary, denary, character sets, images, sound and compression majority covered previously. Sequence, selection, iteration applied based on previous knowledge gained.	Key terminology and application e.g. String manipulation, SQL and random number generation previously taught. Other areas may have been covered through programming challenges set.	Key terminology and application e.g. No previous knowledge covered.	Key terminology and application demonstrated against past exam questions.	Key terminology and application demonstrated against past exam questions.
Assessment <ul style="list-style-type: none"> Formative assessment Summative assessment 	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.
Cultural Capital, Equality, Diversity Inclusion	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.
Literacy/Numeracy	Literacy – Describe/Explain tasks. Numeracy – binary conversions.	Literacy – Describe/Explain tasks. Numeracy – code calculations within variables.	Literacy – Describe/Explain tasks.	Literacy – Identify, Describe, Explain, Discuss tasks. Numeracy – calculations in programming statements and binary/memory conversion calculations.	Literacy – Identify, Describe, Explain, Discuss tasks. Numeracy – calculations in programming statements and binary/memory conversion calculations.

Literacy/Numeracy	Literacy – reading various knowledge extracts. Numeracy – variable calculations.	Literacy – reading various scenarios to interpret key knowledge Numeracy – variable calculations.	Literacy – essay writing. Numeracy – number conversions.	Literacy – essay writing.	Literacy – project writing skills.	Literacy – project writing skills.
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Subject	Computing		Year Group:	13	
Unit/Topic	1.1 The characteristics of contemporary processors, input, output and storage devices. 1.2 Software and software development. NEA programming project	1.3 Exchanging data. NEA programming project	1.4 Data types, data structures and algorithms. 2.1 Elements of computational thinking. 2.2 Problem solving and programming. NEA programming project	2.2 Problem solving and programming. 2.3 Algorithms 1.5 Legal, moral, cultural and ethical issues. NEA programming project	Revision & Assessments
Skills	Computing skills, project management skills.	Computing skills, project management skills.	Mathematical skills, project management skills.	Problem solving, literacy and project management skills.	Revision skills.
Knowledge <ul style="list-style-type: none"> Declarative: ‘Knowing that’ – facts/concepts. Procedural: ‘Knowing how’ – methods/processes 	Declarative e.g. different types of processor. Procedural e.g. which processor is suitable for a specific scenario.	Declarative e.g. what is a network. Procedural e.g. how are different networks set up and why?	Declarative e.g. what are the different Boolean algebra notations. Procedural e.g. write a Boolean expression to solve a problem.	Declarative e.g. What is the difference between declarative and procedural language? Procedural e.g. Use Object oriented techniques.	Declarative e.g. know all the keywords within H446 specification. Procedural e.g. Applying knowledge in exams i.e. application of OOP.
Recall/review from previous learning	Key terminology and application e.g.	Key terminology and application e.g.	Key terminology and application e.g.	Key terminology and application e.g.	Key terminology and application demonstrated against past exam questions.
Assessment <ul style="list-style-type: none"> Formative assessment Summative assessment 	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test.	Formative assessment: teacher questioning, peer assessment and self-assessment. Online low stakes questions used to support knowledge building. Summative assessment – end of unit test. Completion of programming project.	Formative assessment: teacher questioning, peer assessment and self-assessment. Summative assessment – past exam papers.
Cultural Capital, Equality, Diversity Inclusion	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.	Careers for girls in Computing. Other career opportunities.
Literacy/Numeracy	Literacy – Reading and writing. Numeracy – LMC	Literacy – Reading and writing. Numeracy – PageRank.	Literacy – Reading and writing. Numeracy – Variable calc.	Literacy – Reading, writing and extended writing. Numeracy – value calc.	Literacy – Reading and writing. Numeracy – Calculations.

