COMPUTING

OUR AIMS

The Computing Faculty at The Gillford Centre aims to ensure all students are proficient in the use of Computers to allow them to access a variety of resources across the whole school curriculum. Students should be able to make informed choices for their future pathway having experienced a breadth of IT and Computer Science related topics and link these to real world situations and careers.

Our school offers students a range of learning activities that develop their understanding and appreciation of different approaches to Computing that develops both their knowledge and digital skills.

Year 1

Term	**Unit of Study**	**Key Skills Learning**
Yearly	Breadth of Study: Computing	- Work with others and with support to contribute to a digital class resource which includes text, graphic and sound. - Use a range of simple tools in a paint package / image manipulation software to create / modify a picture.
Autumn Term	Online safety Computer skills	- Use technology purposefully to create, organise, store, manipulate and retrieve digital content - Use technology safely and respectfully - Recognise common uses of information technology beyond school - Use technology purposefully to manipulate and retrieve digital content. - Use technology safely and respectfully

Spring Term	Digital painting Programming (scratch)	- To use technology purposefully to create, organise, store, manipulate and retrieve digital content - Use logical reasoning to predict the behavior of simple programs - To understand that programs execute by following precise and unambiguous instructions. - To use logical reasoning to predict the behaviour of simple programs. - To create and debug simple programs.
Summer Term	Programming toys Using and applying	- Understand that programs execute by following precise and unambiguous instructions. - Create and debug simple programs. - Use technology purposefully to create digital content. - Understand how algorithms are implemented as programs on digital devices, and that programs execute by following precise and unambiguous instructions - Use technology purposefully to create, organise, store, manipulate and retrieve digital content

Year 2

Term	**Unit of Study**	**Key Skills Learning**
Yearly	Breadth of Study: Computing	- Generate their own work, (with help where appropriate) combining text, graphics and sound. - Save and retrieve and edit their work. - Use a range of tools in a paint package / image manipulation software to create / modify a picture to communicate an idea. - Create a simple animation to tell a story.

Autumn Term	Online safety Emails Using the internet	- Recognise common uses of information technology beyond school. - Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies - To use technology purposefully to retrieve digital content - To use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the Internet or other online technologies - Use technology purposefully to create, organise, and store digital content i
Spring Term	Programming	- Understand what algorithms are; and that programs execute by following precise and ambiguous instructions. Create and debug simple programs. - Use logical reasoning to predict the behaviour of simple programs
Summer Term	Presentation skills Computer art	- Use technology safely and respectfully - Use technology purposefully to create, organise, store, manipulate and retrieve digital content. - To use technology purposefully to create, organise, store, manipulate and retrieve digital content

Lower KS2 – Year 1 Rolling Cycle

Term	**Unit of Study**	**Key Skills Learning**

Yearly	Breadth of Study: Computing	- Record and present information integrating a range of appropriate media combining text and graphics in printable form and sound and video for on-screen presentations which include hyperlinks. - Begin to show an awareness of the intended audience. - Manipulate digital images using a range of tools in appropriate software to convey a specific mood or idea. Inspiring children, changing lives for a brighter future
Autumn Term	Online Safety Drawing and desktop publishing	- Learn what cyber bullying is - Does and don'ts for sharing personal information online and the impact of your own digital footprint. - To draw objects - Order and group objects - Move, resize and arrange text boxes and images effectively
Spring Term	Internet research and communication Presentation skills	- Pupils will begin to know and understand how word order affects the results returned - Pupils will know how to bookmark a page - Children will know what to do if they don't trust a page - Pupils will create a hyperlink to another slide, use slide transitions, insert audio and video files (where possible) and use organisational devices as required.
Summer Term	Programming Skills - Scratch Using and Applying skills	- Pupils will be able to create and debug algorithms to draw regular polygons using the repeat command/ block - Pupils will use the skills that they have developed over the year to create an information presentation about their school.

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Autumn Term	Digital Research and E-Safety Coding	- To learn what cyber bullying is - Does and don'ts for sharing personal information online and the impact of your own digital footprint. - To use Scratch to programme a Sprite. - To develop vocabulary associated with coding.
Spring Term	Microsoft Office and word processing Digital Media	- Develop Publisher skills including adding text, images, cropping, resizing and moving images to create a poster. - Using ICT to create film and art. Link to English as pupils to bring their story to life.
Summer Term	Data Logging Using the internet	- Capture data using the relevant programme. - Analyse data to answer questions. - To programme sprits to move around the screen. Including making own online games.

Term	**Unit of Study**	**Key Skills Learning**
Yearly	Breadth of Study: Computing	- Use advanced tools in word processing / DTP software such as tabs, appropriate text formatting, line spacing etc appropriately to create quality presentations appropriate for a known audience. - Multimedia work shows restrained use of effects that help to convey meaning rather than impress. - Make a short film / animation from images (still and / or moving) that they have sourced, captured or created. - Use images that they have sourced / captured / manipulated as part of a bigger project (eg presentation or document). -
Autumn Term	E safety and electronic communication. Control.	- Where possible seek and respond to feedback. beginning to understand the purpose of copyright regulations and the need to repurpose information for a particular purpose. - Predict, test and refine their programming.
Spring Term	Modelling and simulations. Understanding technologies	- Set up and use their own spreadsheet, which contains formulae to investigate mathematical models. - Ask "what if …" questions and change variable in their model. - Show an understanding of the school network and how it links computers to resources in school and beyond. - Compare this with other networks they may encounter at home or in the wider world (e.g. banks) -
Summer Term	Data Logging Using the internet	- Realise the advantages of using ICT to collect data that might otherwise be problematic. - Perform a search using different search engines and check the results against each other, explaining why they might be different.

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Autumn Term	E safety and electronic communication. Control.	- Abide by school rules for e-safety. - Independently and - with due regard for safety, search the internet using a variety of techniques to find a range of information and resources on a specific topic. - Use appropriate methods to validate information and check for bias and accuracy. - Independently - create sequences of - commands to control devices in response - to sensing (i.e. use inputs as well as outputs). - Design, build, test, evaluate and modify the system; ensuring that it is fit for purpose.
Spring Term	Modelling and simulations. Understanding technologies	- Understand the need for accuracy when creating formulae and check regularly for mistakes, by questioning results. - Relate their use of spreadsheets to model situations to the wider world - Show an understanding of how filtering and monitoring tools affect their use of the school network and Internet and compare this with their experience of access outside school.
Summer Term	Data Logging Using the internet	- Children are able to identify their own opportunities for data logging and carry out their own experiments. - They check and question results and are able to spot trends in data and identify when problems may have occurred. - Use collaborative tools and e-mail showing a sensitivity for this type of remote collaboration and communication.

Term	Unit of Study	Key Skills Learning
Autumn	e-Safety Block Programming	- Students learn about a number of elements linked to e-Safety and evidence their research using presentation software to develop their skills. - Main concepts include: Cyber Bullying, Computer Legislation, Copyright, Sexting, Cat-Fishing and Identity Theft. - Students learn about the fundamental programming techniques using Code.org Accelerated course. - Main concepts include: Algorithms, Sequence, Selection, Iteration, Operators, Constants & Variables and Boolean Operators.
Spring	Programming Basics (Python) Spreadsheet Basics	- Students learn about command line programming using Python. The basic concepts from the block programming are revisited with students shown how to write code using the correct syntax. - Students learn about the basics of spreadsheets which includes development of knowledge and skills. - Main concepts include: Cells, Active Cells, Rows, Columns, Cell references, Worksheets, Workbooks, Formulas and Functions.
Summer	Digital Imaging	- Students learn how to use digital imaging software to manipulate and create images for a specified purpose. - Main concepts include: layers, composition, duplicate, adjustment, grouping, selection tools

KS3 – Year 2 rolling Cycle

Term	Unit of Study	Key Skills Learning

Autumn	Binary & Logic Programming Development	- Students learn what Binary is and why it is so important to the way that our digital lives are made possible. - Main concepts include: Binary, Converting from and to Binary, Character sets, images and sounds and binary logic. - Students learn how to further develop their programming skills by examining the use of iteration and selection. - Main concepts include: Syntax, Interface, Syntax Error, Logic Error, While Loop, For Loop, Iteration and Conditional Statements.
Spring	Spreadsheet Development Databases Basics	- Students learn how to apply the basic spreadsheet skills they have previously learned to a specific scenario whilst developing more advanced skills. - Main concepts: Cell Ranges, Functions, Fill Handle, Conditional Formatting, IF Statements, CountIFs, Validation, and Charts & Graphs - Students learn how databases are used extensively in today's digital world and how they are structured to store and search data effectively. - Main concepts include: Tables, Records, Fields, Data Types, Validation, Forms, Queries and Reports.
Summer	Cyphers & Cryptography	- Students learn what ciphers are and focuses on how digital content can be protected and displayed in many ways. - Main concepts include: Cryptography, Plain Text, Cypher Text, Encryption Key, Symmetric and Asymmetric, End-To-End Encryption, Caesar Cypher and Brute Force Attacks.

Term	Unit of Study	Key Skills Learning
Autumn	Cyber Security Advanced Programming	- Students learn about the importance of Cyber Security which links to both IT & CS KS4 courses. Revisiting e-Safety with a focus on malware & social engineering threats that exist online and prevention methods. - Main concepts include: Cyber Security, Malware, Social engineering, Hacking, Distributed denial of service (DDoS), System and Physical Vulnerabilities, Cyber Security, SWOT Analysis, Prevention Measures, Legislation. - Students learn about more advanced features of command line programming with a focus on solving specific scenario-based tasks to promote computational thinking. - Main concepts include: Libraries and Lists
Spring	Spreadsheet Project Computer Networks	- Students learn how to apply the spreadsheet skills they have previously learned to a specific scenario that will stretch their understanding and give them a feel for GCSE level work. - Main concepts include: Cell Ranges, Functions, Fill Handle, Conditional Formatting, IF Statements, CountIFs, Validation, Charts & Graphs and VLookups. - Students learn how data is transferred around network to enable the modern online communication methods. - Main concepts include: The Internet, Connectivity, topologies, Client-Server Networks and Encryption.
Summer	History of Computing	- Students learn how about famous figures from the history of Computing and Codebreaking. - Main concepts include: Encryption, The World Wide Web, Logic, Problem Solving, Revision Techniques and Computing Timeline.

ENRICHMENT OPPORTUNITIES

Key stage 3 ACE Computing challenge through Seneca Learning.

HOW TO SUPPORT YOUR CHILD'S LEARNING

Ask them what they think about Computing related items? Why was the device/app created? What purpose does it serve? What new technology is being talked about?

Encourage them to follow official profiles of famous people related to Computing on social media (Elon Musk, Mark Zuckerburg).

WHERE TO GO:

Visit Bletchley Park in Milton Keynes or Museum of Science and Industry in Manchester.

WHAT TO WATCH:

Computing documentaries – The Social Dilemma, The Secret Rules of Modern Living: Algorithms, The Code, We Are Legion: The Story of the Hacktivists

Films/TV Series about technological breakthroughs

Wall-E, Wreck It Ralph, Ralph Breaks the Internet, Tron, Tron Legacy, Iron Man, The Martian.

WHAT TO READ:

Biographies about Alan Turing, Elon Musk, Steve Jobs, Bill Gates, Ava Lovelace, Charles Babbage, Mark Zuckerberg

Historical articles Ava Lovelace, Charles Babbage, George Boole, Konrad Zuse, Gordon Moore, Alan Turing, Grace Hopper, Philip Don Estridge, Margaret Hamilton, Arthur C Clarke, Ted Codd, Tim Berners-Lee, Bill Gates, Steve Jobs, Sergey Brin & Larry Page, Marissa Mayer, Mark Zuckerberg.

ONLINE:

BBC Bitesize KS3 Computing

Code.org – Computational Thinking problems and games for students

Teach Computer Science

The Oak Academy KS3 Computing

Seneca Learning – Free courses for students to follow relating to Computing, Computer Science and Programming

FUTURE CAREERS:

Programmers work in many settings, including corporate information technology ("IT") departments, big software companies, small service firms and government entities of all sizes. Many professional programmers also work for consulting companies at client sites as contractors.

Systems architects are hired by all types of companies, since any company that relies on its own computer network needs someone to ensure infrastructure is properly designed. Companies also need systems architects on staff to make ongoing improvements and troubleshoot problems. Cyber security careers are complex and many roles like:

- Security specialist - An entry-level role with huge potential.
- Security administrator -Keep security systems running smoothly every day.
- Cryptographer -Write the code that hackers can't crack.
- Security architect -Outsmart online criminals by designing tough-to-crack security.
- Forensic expert -Protect the cyber world and assist law enforcement.
- Penetration tester -Hack and protect computer systems for good reasons.