Computing at Springfield

Vision

At Springfield, we value the computing curriculum. We believe computing is a crucial part of children's learning, as technology is now essential to our lives. We aim to equip the children with 'computational thinking' skills, so as to enable them to participate effectively in this digital world and provide them with all the necessary tools to achieve their highest potential in adult life. Computational thinking provides insight into many areas of the curriculum and allows us to solve problems and design systems. We believe that children who can think computationally are better able to conceptualise, understand and use computer-based technology, and so are better prepared for today's world and the future.

The national curriculum outlines the three strands of computing that children should be taught: computer science, information technology and digital literacy. Within computer science, children at Springfield learn the main vocabulary, including programming, algorithm, debug, repetition and coding. In each year group, they practically explore writing code and creating programs, as well as using logical reasoning to explain how algorithms work. Information technology is the strand that focuses on understanding the internet, using search technologies efficiently and collecting, evaluating and presenting data and information. Finally, within digital literacy, we aim to provide children with the tools to stay safe online. In a world where any information is accessible at all times, and any information can be posted and shared by anybody, we value strongly the importance of equipping children at Springfield with the knowledge and tools to discern reliable facts from ones that are not. We believe it is crucial that children understand the importance of sharing information online and are able to consistently make safe choices online.

How we plan for and teach Computing

Children learn how computers and computer systems work, as well as design and build programs, develop their ideas using technology and create a range of content. Computing is a practical subject and at Springfield we value its aspects of invention, resourcefulness and resilience, which are thus encouraged. Computing lessons take place in our ICT suite, which is equipped with a range of Mac computers, as well as many laptops. All classes access the ICT suite once a week and have a set of 10 IPADS available in class at all times, as well as extra ones to be used when needed. As well as computing lessons, children are regularly accessing computing equipment during the day, including reading books online, completing cross curricular tasks and presenting their work in a digital form. Teachers plan a different unit of work for each half term and coverage of all three strands of the computing curriculum is ensured. Some aspects of digital literacy, with a focus on e-safety, are covered in PSHE lessons as well as whole school assemblies.

How we evaluate learning in Computing

The impact of our computing curriculum can clearly be seen in projects that children create as well as presentations created as digital content. Teachers review children's learning in each lesson to evaluate strengths and plan for next steps. Programs that children write code for are saved digitally and accessed by teachers to ensure achievement of learning objectives and progression through the curriculum. Children have the opportunity to self-assess the content they have created, as well as peer-assess. In each year group, children use past learned skills and apply them to new software and coding programs that they are exploring.

Year 1: Computing Curriculum Map

Unit	We are digital artists	We are Beebot programmers	We are computer scientists	We are digital photographers	We are data scientists on a minibeast hunt	We are digital creators
Overview	Children are introduced to logging in and using technology for a purpose, including art.	Children use Bee-Bots to navigate an area and construct simple algorithms, through a story.	Children learn how computers handle information by exploring 'unplugged' algorithms completing tasks away from the computer.	Children take and manipulate digital photographs, including adding images found via a search engine.	Children learn about what data is and how it can be represented and use these skills to show the findings of a minibeast hunt.	Children learn to appreciate the value of computers, understanding that they have helped humans complete unimaginable tasks and achievements.
National Curriculum	**Digital Literacy:** Recognising common uses of information technology. Logging in and saving work. How to create digital art using an online paint tool. E-safety. **Information Technology:** Locate where keys are on the keyboard. Developing basic mouse skills.	**Computer science:** Learning how hardware works by exploring it. Constructing a series of instructions into a simple algorithm. Applying computing concepts to real world situation.	**Computer science:** Understanding how to create algorithms. Learning that computers need information to be presented in a simple and clear way. Understanding how to break computational thinking problem into smaller parts in order to solve it.	**Digital literacy:** Using technology purposefully to create, organise, store, manipulate and retrieve digital content. E-safety. **Computer science:** Using logical reasoning to predict the behaviour of simple programs. **Information technology:** Using cameras or tablets to take photos.	**Digital literacy:** Using technology purposefully to create, organise, store, manipulate and retrieve digital content. **Information technology:** Recognising uses of technology beyond school.	**Digital literacy:** Using technology purposefully to create, organise, store, manipulate and retrieve digital content.
Key skills	Learning about computers. Using Sketchpad to create digital prints. Developing mouse skills. Create paintings by layering concentric shapes. Create pictures to retell scenes of stories. Create a digital self-portrait.	Exploring the Beebot device. Making an explanatory video. Being a programmer. Programming Beebots with specific instructions to reach a destination. Directing a Beebot on a Beebot themed map.	Creating an algorithm. Following an algorithm to draw a creature. Understanding inputs and outputs. Using decomposition to break a process into steps. Debugging a set of instructions.	Designing stories using photos and sequencing skills. Taking photos. Editing photos. Using a creative layout and adding text and decorative effects.	Exploring the meaning of the word 'data'. Using online software, children represent data. Creating a chart or pictogram. Creating a branching database to play a game. Design a computerised invention to gather and present data.	Learning about types of digital content. Using online drawing software. Using the skill of sequencing. Following instructions to build something and debugging when necessary. Recording data in a spreadsheet or table.
Outcomes	Digital prints, digital paintings and digital self-portraits.	Retelling a story using Beebots.	Creating an algorithm.	Photo collage.	Computerised invention to gather and present data.	School-made rocket.

Year 2: Computing Curriculum Map

Unit	We are computer inventors	We are digital typers	We are Scratch Jr programmers	We are debuggers	We are data scientists on board the ISS	We are stop motion creators
Overview	Children learn about inputs and outputs, how computers are used in the wider world and design their own computerised invention.	Pupils write simple messages to friends using word processing skills and learn about being safe online (who do we talk to online?)	Using Scratch Jr, children programme a familiar story and an animation of an animal, making their own musical instruments and follow an algorithm to record a joke.	Identifying problems with code to diagnose and correct errors (debugging).	Building on their own understanding of how computers sense what's going on around them, children learn how this can be used in the context of keeping astronauts healthy when on board the ISS.	Children tell a story by exploring how to create an animation using stop motion technology.
National Curriculum	**Computer Science:** Learning about inputs and outputs. **Information technology:** Understand what a computer is and the role of its components.	**Digital Literacy:** Using word processing software to type and reformat text. Understanding the importance of staying safe online.	**Computer science:** Creating and debugging simple programs. Using logical reasoning to predict the behaviour of simple programs. Understanding what algorithms are. **Digital literacy:** Using technology to create digital content.	**Computer science:** Creating and debugging simple programs. Using logical reasoning. Understanding what algorithms are.	**Digital Literacy:** Using technology to create and label images and to put data into a spreadsheet. **Computer science:** Consider inputs and outputs to understand how sensors work.	**Digital Literacy:** Using technology to create, organise, store, manipulate and retrieve digital content. **Information technology:** Understanding how to use tablets or computers to take photos.
Key skills	Name the different parts of a computer. Label a robot to identify the inputs it requires. Develop understanding of what a computer is. Design their own inventions, which include inputs and outputs. Explore computers in the real world.	Learn about the layout of a keyboard and touch typing. Learn about word processing and text documents. Edit and format images in a text document. Copy and paste text. Create digital posters.	Dragging blocks and running code. Programming their own animals. Create a musical instrument and use the microphone option. Programme their own joke. Programme a story.	Learning to follow instructions carefully. Learning that computers use algorithms to make predictions. Explore Lightbot to direct a robot through a maze. Develop understanding of abstraction. Physically construct a robot.	Learning about the ISS (International Space Centre) and how computers are used to collect data. Developing mouse and keyboard skills. Collecting and presenting data. Creating algorithms. Interpreting data.	Creating a stop motion. Planning an animation through a storyboard. Creating an animation. Reviewing animations.
Outcomes	Designing an invention which includes inputs and outputs.	Creating digital posters	Programme a well-known story.	Creating a physical robot by listening to instructions and debugging.	Creating an algorithm for growing a plant in space.	Creating their own animations using a storyboard.

Year 3: Computing Curriculum Map

Unit	We are email professionals	We are computer experts	We are Top Trumps Databases creators	We are book trailers creators	We are Scratch programmers	We are computer networks experts
Overview	Pupils learn how to send emails, including attachments and how to be responsible digital citizens.	Children learn about the different parts of a computer through role-play and develop their understanding of how they follow instructions.	Developing their understanding of data and databases, children play with and create their own Top Trumps cards, learning how to interpret information by ordering and filtering.	Developing their video skills, pupils create a book trailer, storyboarding their trailers before then filming and editing their videos, adding effects such as transitions, music, voice and text.	Using Scratch, with its block-based approach to coding, pupils learn to tell stories and create simple games.	To understand how computers communicate, children learn about networks and how they are used to share information.
National Curriculum	**Digital Literacy:** Learn about cyberbullying and fake emails. Understanding the purpose of emails.	**Information Technology:** Understanding what different components of a computer do. **Computer science:** Understanding that programs execute by following precise and unambiguous instructions.	**Digital Literacy:** Using technology purposefully to create, organise, store, manipulate and retrieve data.	**Digital Literacy:** Using technology purposefully to create, organise, store, manipulate and retrieve digital content, including searching for relevant information.	**Computer science:** Using logical reasoning to explain how simple algorithms work. Designing, writing and debugging programs. Solving problems. Using sequence, selection, and repetition in programs.	**Information Technology:** Identifying network components and how data is transferred.
Key skills	Learn about emails and send an email. How to add attachments to emails. Use of positive language in emails. What CyberBullying is and what to do if it happens. Learn about spam, junk and phishing emails.	Learn about inputs and outputs. Consolidate understanding of different components of a computer. Create artwork by following an algorithm. Develop understanding of the purpose of different components of computers.	Learn the meanings of records, fields and data. Sort and filter data using a database. Represent data from a database.	Create a storyboard. Take photos and videos. Import footage into film editing software and record and add sounds. Learn about transitions in videos.	Explore scratch and the functionality of the different blocks available. Create musical instruments. Remix an animation. Play 'Robot Bop' and explain the action and algorithm behind it.	Learn the terms 'network', 'device' and 'wireless'. Identify different components of their school network. Create an animation to show understanding of how a file is shared.
Outcomes	Writing emails	Drawing a diagram of a tablet	Sort and filter data to plan a holiday	Make a book trailer	Programming a game	Create an animation

Year 4: Computing Curriculum Map

Unit	We are creators of online safety content	We are World Wide Web experts	We are website designers	We are HTML users	We are weather investigators	We are program designers, debuggers and writers
Overview	Learning to work collaboratively in a responsible way using tools including Google Docs and Sheets	We use the Internet every single day, but 30 years ago, it didn't exist. In this topic, pupils learn how data is transferred around the world using the world wide web.	Pupils design and create their own websites, considering content and style, as well as understanding the importance of working collaboratively.	Pupils explore the language behind well known websites, while developing their understanding of how to change the core characteristics of a website using HTML and CSS.	Children investigate the role of computers in forecasting and recording weather as well as how technology is used to present forecasts.	Through developing their understanding of the four pillars of computational thinking, children learn to identify them in different contexts.
National Curriculum	**Digital Literacy:** Selecting, using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals. Understanding opportunities offered by the World Wide Web for communication and collaboration.	**Digital Literacy:** Understanding computer networks. **Information Technology:** Identify components of a network and understand how they used to connect to the Internet.	**Digital Literacy:** Selecting, using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals. Understanding opportunities offered by the World Wide Web for communication and collaboration.	**Digital Literacy:** Recognising that information on the Internet might not be true or correct. Using technology safely. **Computer science:** Understanding that websites can be altered. Designing, writing and debugging programs. Solving problems.	**Digital Literacy:** Understanding why some sources are more trustworthy than others. **Computer science:** Understanding the role of inputs and outputs in computerised devices.	**Computer science:** Understand what decomposition is and how it facilitates problem solving. Designing, writing and debugging programs that accomplish specific goals Understand abstraction and patterns recognition.
Key skills	Learn about Google Docs. Learn about a slide presentation program and its features. Introduced to Google Forms. Create and share surveys and questionnaires. Explore spreadsheets and learn how to extract information from the data.	Create a presentation about the Internet's networks. Draw a map to show how we share information and images from a website. Learn about routers and how they work.	Introduction to Google Sites. Create a web page for a class website. Create a book review page. Plan and create their own website.	Learn what HTML is. How to edit HTML to create their own posters. Create storyboards. Learn about the issue of fake news and hack the code of a website. Create their own news story.	Explore the weather and record data in a spreadsheet. Design a weather station. Design an automated machine. Learning how weather forecasts are made. Present a weather forecast video.	Learn about computational thinking. Predict what a piece of code might do. Explore abstraction and pattern recognition. Create a game in Scratch using algorithm design. Solve plugged and unplugged challenges, using computational thinking.
Outcomes	Create presentations, surveys and questionnaires.	Create a presentation and map to present learning.	Create a website.	Creating a news story	Making a weather forecast video	Create a game in Scratch

Year 5: Computing Curriculum Map

Unit	We are online resource creators	We are micro:bit programmers	We are researchers	We are Sonic Pi musicians	We are Mars Rover data experts	We are CAD designers
Overview	Pupils create an online safety resource for younger children using tools such as presentation software, video tools or a simple stop-motion animation.	Programming a small device called a micro:bit to display animations or messages on its simple LED display using block coding	To enable children to quickly and accurately find information and become independent learners, they need to develop their searching skills and learn how to identify trustworthy sources.	Composing music using code through Sonic Pi, pupils can import samples, add drum beats and compose simple tunes culminating in a 'battle of the bands' using live loops of music.	Pupils explore inputs and outputs as well as Binary numbers to understand how the Mars Rover transmits and receives data and how scientists are able to control it to explore another planet!	Children learn how the Mars Rover is able to send images all the way back to Earth and experiment with online CAD software to design new tyres for it.
National Curriculum	**Digital Literacy:** Recognising that information on the Internet might not be true or correct. Using technology safely, by recognising acceptable/unacceptable behaviour and knowing what to do when they have concerns about content or contact online.	**Computer science:** Using block coding to program a device To explore variables and different forms of input. **Information Technology:** Understand how external devices can be programmed by a separate computer.	**Digital Literacy:** Recognising that information on the Internet might not be true or correct. Know how to use key words to quickly find accurate information.	**Digital Literacy:** Selecting, using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals. **Computer science:** Using programming language to create music, including use of loops.	**Digital Literacy:** Understanding computer networks. **Information Technology:** Using search technologies effectively, appreciating how results are selected and ranked. Recognising that computers transfer data in binary and understand simple binary addition.	**Digital Literacy:** Developing their CAD skills. **Information Technology:** Understanding how image data is transferred.
Key skills	Discuss online safety. Plan a storyboard about online safety using Stop Motion. Create an animation using Stop Motion. Edit animations, adding sound.	Investigate the BBC micro:bit device. Learn how an animation is created. Use the BBC micro:bit as a polling program. Turn the micro:bit into a pedometer. Use the BBC micro:bit as a scoreboard.	Learn how to check that information we find is accurate. Develop research skills. Create an informative poster using the software Canva. Learn how search engines work.	Explore Sonic Pi. Create a piece of music using programming. Compose the soundtrack to a story. Learn about loops and how to create a repeating beat or rhythm.	Learn that information collected by Mars Rover has to travel as 'data' and is translated into binary code. Play a game that simulates programming a Mars Rover. Perform addition and subtraction binary calculations.	Learn about pixels. Learn about different image formats and how compression works. Learn about how the Mars rover follows instructions. Design a new tyre for the Mars rover using 3D software.
Outcomes	Create a stop motion animation.	Create a scoreboard using the BBC micro:bit.	Create a poster using Canva.	Create music	Create messages using binary.	Design a 3D Mars Rover tyre using online software.

Year 6: Computing Curriculum Map

Unit	We are historians exploring the history of computers and secret codes	We are Python Programmers	We are barcodes experts	We are data designers	We are digital project creators
Overview	Children learn about the history of Bletchley Park, including: key historical figures, how the first modern computers were created as part of a WWII code breaking team and consider how computers have evolved over time. They then go on to investigate secret codes and how they are created, exploring 'brute force' hacking and learn how to make passwords more secure.	Building on their knowledge of coding from previous years, children are introduced to the text-based programming language Python, which is the language behind many apps and programs, such as Dropbox.	Children learn how data is collected and stored by exploring barcodes, QR codes and RFID chips, and investigate how collecting big data can be used to help people in a variety of different scenarios.	Children learn the difference between mobile data and WiFi and how data is transferred and use their understanding of big data to design their own smart school.	Reflecting on and showcasing their computing skills, pupils create an entire project around a specific theme.
National Curriculum	**Digital Literacy:** Understanding the importance of secure passwords and using searching and word processing skills to create a presentation. Editing sound recordings for specific purposes. **Computer science:** Using programming software to understand hacking, relating this to computer cracking codes in WWII. **Information Technology:** Learning about the history of computers and how they evolved over time.	**Computer science:** Understanding that websites can be altered by exploring the code beneath the site. Designing, writing and debugging programs that accomplish specific goals Solving problems by decomposing them into smaller parts.	**Digital Literacy:** Understanding how learning can be applied to a real world context. Selecting, using and combining a variety of software to design and create a range of programs, systems and content to collect, analyse, evaluate and present data. **Information Technology:** Understanding that computer networks provide multiple services Understanding how barcodes and QR codes work.	**Digital Literacy:** Selecting, using and combining a variety of software to design and create a range of programs, systems and content to collect, analyse, evaluate and present data.	**Digital Literacy:** Showcasing their digital literacy skills. **Computer science:** Demonstrating their computational thinking skills by designing and debugging programs, using different inputs and outputs. **Information Technology:** Understanding how search engines work and knowing how to use them safely and effectively.
Key skills	Explore a variety of codes. Learn what Brute Force hacking is. Find out about Bletchley during WWII. Learn about important historical figures in the field of computing. Research and present information. Create and edit a radio play. Look at the evolution of computers. Research one historical computer and present information. Design a computer for the future.	Learn about Logo and create simple designs. Explore the use of loops within loops. Recreate a picture using Python. Use loops in Python to create art. Decompose a program and write an algorithm to create pieces of artwork.	Use an online QR generator to create a secret code. Learn about the different types of light signals. Children learn about the 'chip' and 'reader' technology (RFID). Think about how Big Data can be used to improve customer experience at a theme park. Analyse data and consider how they could turn an app into a successful App.	Learn how data can be transferred. Learn about the difference between Wifi and mobile data. Understand how we have come to Big Data. Design a system for a smart school.	Use an electronic product to design and use code. Make their code more efficient. Use TinkerCAD to design the housing of their product. Create a website for their product. Create a video advert for their product.
Outcomes	Design a computer for the future.	Write an algorithm to create art.	Design an app.	Design a system for a smart school.	Plan, design and create a product.