Harrietsham Church of England Primary School

Computing CURRICULUM SKILLS OVERVIEW

National Curriculum Aims

The national curriculum for 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.

At Harrietsham, we teach Computing using the Teach Computing scheme, which covers all aspects of the National Curriculum. This ensures that skills and knowledge are built on year by year and sequenced appropriately to maximise learning for all children. We have used the supporting documentation of the scheme to help us develop the progression and key concepts detailed below.

	YR	Y1	Y2	Y3	Y4	Y5	Y6
Computing Concepts							
Algorithms and Programming							
Data and information							
Systems and networks							
Creating Media							
E-Safety	Taught throughout (inclusive of our PSHE and RSE units as well)						

EYFS	Knowledge	Skills	Vocabulary			
			CNS	Programming	Multimedia	Handling Data
	• I know that technology can be used for a wide range of purposes. • I know the names of some different devices. • I know I can use technology to find information online.	• I can use a device to interact with age-appropriate computer software. • I can create images on a screen. • I can take photographs on an ipad. • I can play with beebots and can explore how to make them move by inputting instructions.	Computer Mouse Keyboard Screen	Robot Buttons movement	Pictures Words Sounds Video paint	Collect Count Sort

Year 1	**Systems and Networks** • I can identify a computer and its main parts, switching it on and logging on. • I understand that technology is all around us and can be used for a variety of things. **Creating Media** • I know that I can use technology for text (writing) and drawing pictures. • I know technology can be used to create and present my ideas. **Algorithms & Programming** • I know some technology follows instructions. • I understand what an algorithm is. • I know what the word debug means. **Data and Information** • I can use technology to collect and collate information. • I understand that information comes in different forms, including number, video and sound. • I understand information can be sorted and shared in a range of ways.	**Systems and Networks** • I can identify technology around me and explain how they help us. • I can use a mouse in different ways. • I can use the keyboard to type and edit text. • I can save my work and open my work from a file. **Algorithms & Programming** • I can use simple instructions to make a robot move. • I can use software to create a simple animation. **Creating Media** • I can use technology to create an image. • I can use technology to write, changing font type, colour and size. **Data and Information** • I can use technology to collect and group data.	Username Log in Log out Avatar Computer Mouse Screen Keyboard technology	Robot Instructions Left turn Right turn Forward Backward Robots Patterns Program animation Sound effect	Space bar Backspace key Delete key Shift key palette	Sort Criteria Pictogram Data Collate

Year 2	**Systems & Networks** • I know the uses and features of information technology. • I understand and can explain how information technology benefits us. **Algorithms & Programming** • I know how to write a simple algorithm. • I can observe an algorithm and spot where it needs debugging. • I know how to create and debug simple programs. **Creating Media** • I know technology can be used to create sounds and music. • I can describe how music can be used in different ways. • I know what devices can be used to take photographs. • I know and can describe what makes a good photograph. **Data and Information** • I can talk about the different ways I use technology to collect information, including a camera, microscope or sound recorder. • I can recognise that people can be described by attributes. • I can explain that we can present information using a computer.	**Systems & Networks** • I can identify information technology in the home and beyond school. • I can explain how information technology benefits us. • I can open a file. • I can move and resize images. **Algorithms & Programming** • I can use simple algorithms to make a robot move. • I can use algorithms to create a quiz. • I can use logical reasoning to predict the behaviour of simple programs. **Creating Media** • I can use technology to take and edit photos. • I can use technology to make music. **Data and Information** • I can use software to create pictograms to display data. • I can use technology purposefully to create, organise, store, manipulate and retrieve digital content.	Computers Information technology Software Hardware Digital device	Right-angle turn Algorithm Sequence input Direction Sprite Debug Predict	File Save Undo Return key Font Transitions Composition Instrument Music Tempo Volume digitally	Pictogram Question Data Information Collate Graphs

Year 3	**Systems & Networks** • I know the functions of digital devices and networks. • I recognise how digital devices can change the way we work. • I can explore how digital devices can be connected and can explain the role of a switch, server, and wireless access point in a network. • I can recognise the physical components of a network. **Algorithms & Programming** • I know how to break open-ended problems into smaller parts. • I know a wider range of commands that can be used to write more complex algorithms. • I know computer programs need to be designed for a purpose. **Creating Media** • I can recognise how text and images convey information. • I know the benefits of desktop programs. • I know that animation is a sequence of drawings or photographs. **Data and Information** • I know how to use a range of strategies to collect, sort and review data. • I know what a branching database is.	**Systems & Networks** • I can identify input and output devices. • I can explain how a computer network can be used to share information. **Algorithms & Programming** • I can use repeat commands when programming. • I can meet design specifications when programming. • I can use more complex algorithms when programming. **Creating Media** • I can combine text, graphics and sound in desktop publishing to suit different purposes. • I can plan, create and review a stop-frame animation. **Data and Information** • I can collect and present information in a branching database.	Password Input Process Output Network Switch Server WAP	Sequence Repetition Instructions If Debugging Test and improve Event output Programming Audio Media Background	Align Bold Italic Underline highlight Landscape Portrait Images Animation Frame Play stop-motion	Branching database Find Record Group arrange Statistic

Year 4	**Systems & Networks** • I can explain the function of networks including the internet. • I know that websites can be shared via the World Wide Web. **Algorithms & Programming** • I know what a sensor is. • I know a range of tools that I can use to create a program. • I recognise the positive impact of algorithms. **Creating Media** • I know that digital images can be changed and can explain how they might be changed for different uses. • I recognise that not all images are real. • I know that sound can be digitally recorded and is stored as a file. **Data and Information** • I know how to organise, analyse and review data collections. • I know how to use data loggers.	**Systems & Networks** • I can describe how networks physically connect to other networks. • I recognise how networked devices make up the internet. • I can outline how websites can be shared via the World Wide Web. • I can describe how content can be added and accessed on the World Wide Web. **Algorithms & Programming** • I can use a variety of tools to create a program using Scratch and simplify a programme when needed. **Creating Media** • I can use text, photo and sound editing tools to enhance my work. • I can use a range of tools to change the composition of images and sounds. **Data and Information** • I can use data loggers to collect data. • I can collect and organise data and use it to answer questions.	Internet WWW Webpage Website	Action Selection Logo commands Open-ended problems Bugs If Repeat Pen	Copy Paste Document Shortcuts	Table Charts Data logging Present data Input

Year 5	**Systems & Networks** • I know the function of computer systems. • I understand how the internet works to enable us to work online. • I know how sharing information online lets people in different places work together. **Algorithms & Programming** • I know how to write complex algorithms with 'if' and 'then' commands. • I understand the term 'decomposition'. **Creating Media** • I recognise video as moving pictures, which can include audio. • I recognise the features of an effective video. • I can identify digital devices that can record video. • I know that technology can be used for drawing and design. • I can identify that drawing tools can be used to produce different outcomes. **Data and Information** • I know how to spot mistakes in data and suggest how to check the data. • I know how to use a database to ask and answer real-world questions.	**Systems & Networks** • I can explain that computers can be connected together to form systems. • I can recognise the role of the computer systems in our lives. • I can recognise how information is transferred over the internet. • I can contribute to a shared project online. • I can evaluate different ways of working together online. **Algorithms & Programming** • I can decompose a problem into smaller parts to design an algorithm for a specific outcome and use this to write a program. • I can refine a procedure using repeat commands to improve a program. • I can use 'if' and 'then' commands to select an action. **Creating Media** • I can capture video using a digital device and improve it through reshooting and editing. • I can create a vector drawing by combining shapes and using the appropriate tools to achieve a desired effect. **Data and Information** • I can use a flat-file database to answer real-world questions.	Systems Communicate Search engines Web crawlers	Procedure Variable Sequence Quiz Selection repeat Inputs Solutions commands	insert Layer objects Timelines	Find Statistics Flat file Field Text Numeric investigate Report

Year 6	**Systems & Networks** • I know how internet search engines work. • I can identify the benefits and negatives of digital communication. **Algorithms & Programming** • I understand the term 'deconstruct'. • I can explain each of the steps in my algorithm. • I can analyse and debug complex algorithms. **Creating Media** • I know a range of software and can select the appropriate software to match the purpose. • I know that the audience atmosphere and structure need to be considered when planning a particular outcome. • I know the features of an effective website and use this to review existing websites considering its structure. • I can explain what animation is and can relate animated movement with a sequence of images. **Data and Information** • I know how to construct formulae and apply them to data. • I know a range of ways that spreadsheets can be used including for real-world actions.	**Systems & Networks** • I can identify how to use a search engine effectively. • I can describe how search engines select results. • I can explain how search results are ranked. • I can recognise why the order of the results is important, and to whom. • I can recognise how we communicate using technology. • I can evaluate different methods of online communication. • I understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration. • I am discerning in evaluating digital content. **Algorithms & Programming** • I can deconstruct a problem into smaller steps, recognising similarities to solutions used before. • I can use sequence, selection, and repetition in programs; work with variables and various forms of input and output. • I can use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs. **Creating Media** • I can create a web page including inserting hyperlinks. • I can use technology to insert and manipulate shapes to design a 3D model. **Data and Information** • I can use spreadsheets to collect, organise, sort and display data. • I can use formula to complete calculations to answer questions on the data entered. • I can select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.	Protocols Domain name Packets Public Private Collaboration HTML	Predict Plan Test and review Program Selection variable Count controlled loops Conditions	Hyperlinks CAD Modelling 2D 3D Viewpoint Net Polygon 3D printing	Column Cells Rows Formula Sum Range Calculate Analyse Spreadsheet Value

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
EYFS		**Systems and Networks** I can use a device to interact with age-appropriate computer software. I know the names of some different devices.	**Creating Media** Multimedia – Digital Painting I can create images on a screen.	**Creating Media** Using the iPad – games, photos, videos. I can take photographs on an iPad.	**Algorithms & Programming** I can play with beebots and can explore how to make them move by inputting instructions.	**Creating Media** Using the Keyboard – Digital Writing **Systems and Networks** I know I can use technology to find information online.

	Y1	Y2	Y3	Y4	Y5	Y6
Systems & Networks	Pupils should be taught to: Recognise common uses of information technology beyond school. Use technology purposefully to create, organise, store, manipulate and retrieve digital content		Pupils should be taught to: Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information			
	AUT 1 Identify technology around me and explain how they help us. Identify a computer and its main parts, switching it on and logging on. Know how to use a mouse, or equivalent, in different ways. Use the keyboard to type and edit text. I know how to create rules for using technology safely.	AUT 1 Recognise the uses and features of information technology. Identify information technology in school. Identify information technology beyond school. Explain how information technology helps us in life.	AUT 1 Explain how digital devices function. Identify input and output devices (keyboard, mouse, microphone, printer, speakers) Recognise how digital devices can change the way we work. Explain how a computer network can be used to share information (joined by wires/wireless). Explore how digital devices can be connected and can explain the role of a switch, server, and wireless access point in a network. Recognise the physical components of a network.	AUT 1 Describe how networks physically connect to other networks (multiple networks using the internet). I know how networked devices make up the internet. Outline how websites can be shared via the World Wide Web. Describe how content can be added and accessed on the World Wide Web. Recognise how the content of the WWW is created by people (E-safety link). Evaluate the consequences of unreliable content	AUT 1 Explain that computers can be connected together to form systems. Recognise the role of the computer systems in our lives. Identify how to use a search engine to find specific information. Describe how search engines select results. Explain search engines follow rules to rank results. Recognise why the order of the results are important but there are limitations to search engines.	AUT 1 Explain why internet addressed are important (as they access different websites). Recognise how data is transferred across the internet. Explain how sharing information online can help people to work together (Google). Evaluate ways on working together online (public and private collaboration). Recognise how we communicate using technology. Evaluate different methods of online communication.
	https://studio.code.org/s/course1/stage/3/puzzle/1 Word	PowerPoint/Google Slides Word/Google Docs	Paint.net	Chrome music lab	PowerPoint/Google Slides Internet	Internet

	Y1	Y2	Y3	Y4	Y5	Y6
Algorithms and Programming	Pupils should be taught to: Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions. Create and debug simple programs. Use logical reasoning to predict the behaviour of simple programs.		Pupils should be taught to: Write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by debugging them into smaller parts. Use sequence selection and repetition in programs; work with variables and various forms of input and output. Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs. Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals.			
	SPR 1 Explain what a given command will do. To act out a given word. To combine 'forwards' and 'backwards' commands to make a sequence. To combine four direction commands to make sequences. To plan a simple program. To find more than one solution to a problem. SUM 2 To choose a command for a given purpose To show that a series of commands can be joined together To identify the effect of changing a value To explain that each sprite has its own instructions To design the parts of a project To use my algorithm to create a program	SPR 1 To describe a series of instructions as a sequence To explain what happens when we change the order of instructions To use logical reasoning to predict the outcome of a program To explain that programming projects can have code and artwork To design an algorithm To create and debug a program that I have written SUM 2 To explain that a sequence of commands has a start To explain that a sequence of commands has an outcome To create a program using a given design To change a given design To create a program using my own design To decide how my project can be improved	SPR 1 To explore a new programming environment To identify that commands have an outcome To explain that a program has a start To recognise that a sequence of commands can have an order To change the appearance of my project To create a project from a task description SUM 2 To explain how a sprite moves in an existing project To create a program to move a sprite in four directions To adapt a program to a new context To develop my program by adding features To identify and fix bugs in a program To design and create a maze-based challenge	SPR 1 To identify that accuracy in programming is important To create a program in a text-based language To explain what 'repeat' means To modify a count-controlled loop to produce a given outcome To decompose a task into small steps To create a program that uses count-controlled loops to produce a given outcome SUM 2 To develop the use of count-controlled loops in a different programming environment To explain that in programming there are infinite loops and count-controlled loops To develop a design that includes two or more loops which run at the same time To modify an infinite loop in a given program To design a project that includes repetition To create a project that includes repetition	SPR 1 To explain how selection is used in computer programs To relate that a conditional statement connects a condition to an outcome. To explain how selection directs the flow of a program. To design a program that uses selection. To create a program that uses selection. To evaluate my program, identifying ways it can be improved. SUM 2 To create a program to run on a controllable device To explain that selection can control the flow of a program To update a variable with a user input To use a conditional statement to compare a variable to a value To design a project that uses inputs and outputs on a controllable device To develop a program to use inputs and outputs on a controllable device	SPR 1 To define a 'variable' as something that is changeable To explain why a variable is used in a program To choose how to improve a game by using variables To design a project that builds on a given example To use my design to create a project To evaluate my project, identifying ways it could be improved. SUM 2 (opportunities for continuation Y5 unit) To create a program to run on a controllable device To explain that selection can control the flow of a program To update a variable with a user input To use a conditional statement to compare a variable to a value To design a project that uses inputs and outputs on a controllable device To develop a program to use inputs and outputs on a controllable device
	Moving a robot Introduction to animation	Robot Algorithms Introduction to quizzes	Sequence in music Events and actions	Repetition in shapes Repetition in games	Selection in Physical Computing Selection in quizzes	Variables in games Selection in Physical Computing
	BeeBots Scratch Jr	BeeBots Scratch Jr	Scratch Jr	Logo Scratch	Micro:bits Scratch	Scratch Crumble kits

	Y1	Y2	Y3	Y4	Y5	Y6
Creating Media	Pupils should be taught to: use technology purposefully to create, organise, store, manipulate and retrieve digital content		Pupils should be taught to: select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information			
	AUT 2 To describe what different freehand tools do To use the shape tool and the line tools To make careful choices when painting a digital picture To explain why I chose the tools I used To use a computer on my own to paint a picture To compare painting a picture on a computer and on paper SUM 1 To use a computer to write To add and remove text on a computer To identify that the look of text can be changed on a computer To make careful choices when changing text To explain why I used the tools that I chose To compare typing on a computer to writing on paper	AUT 2 To use a digital device to take a photograph To make choices when taking a photograph To describe what makes a good photograph To decide how photographs can be improved To use tools to change an image To recognise that photos can be changed SUM 1 To say how music can make us feel To identify that there are patterns in music To experiment with sound using a computer To use a computer to create a musical pattern To create music for a purpose To review and refine our computer work	AUT 2 To explain that animation is a sequence of drawings or photographs To relate animated movement with a sequence of images To plan an animation To identify the need to work consistently and carefully To review and improve an animation To evaluate the impact of adding other media to an animation SUM 1 To recognise how text and images convey information To recognise that text and layout can be edited To choose appropriate page settings To add content to a desktop publishing publication To consider how different layouts can suit different purposes To consider the benefits of desktop publishing	AUT 2 To identify that sound can be recorded To explain that audio recordings can be edited To recognise the different parts of creating a podcast project To apply audio editing skills independently To combine audio to enhance my podcast project To evaluate the effective use of audio SUM 1 To explain that the composition of digital images can be changed To explain that colours can be changed in digital images To explain how cloning can be used in photo editing To explain that images can be combined To combine images for a purpose To evaluate how changes can improve an image	AUT 2 To explain what makes a video effective To use a digital device to record video To capture video using a range of techniques To create a storyboard To identify that video can be improved through reshooting and editing To consider the impact of the choices made when making and sharing a video SUM 1 To identify that drawing tools can be used to produce different outcomes To create a vector drawing by combining shapes To use tools to achieve a desired effect To recognise that vector drawings consist of layers To group objects to make them easier to work with To apply what I have learned about vector drawings	AUT2 To review an existing website and consider its structure. To plan the features of a web page. To consider the ownership and use of images (copyright). To recognise the need to preview pages. To outline the need for a navigation path To recognise the implications of linking to content owned by other people SUM 1 + SUM 2 (cont.) To recognise that you can work in three dimensions on a computer To identify that digital 3D objects can be modified To recognise that objects can be combined in a 3D model To create a 3D model for a given purpose To plan my own 3D model To create my own digital 3D model
	Multimedia – Digital Writing & Digital Painting	Multimedia – Making Music & Digital Photography Continue to build upon Year 1 skils.	Multimedia – desktop publishing and Stop frame animation	Multimedia – Photo editing & Audio editing	Multimedia – Vector drawing and Video editing.	Multimedia – 3D Modelling and Web page creation.
	Word/Google Docs Paint	iPads/digital cameras Pixlr Chrome Music Lab	Paint iMotion App iPads	Devices able to record & play back sound/Laptop with Audacity Software & Paint.net	Google drawing Powerpoint Microsoft Publisher	Tinkercad Google sites

	Y1	Y2	Y3	Y4	Y5	Y6
Data and information	Pupils should be taught to ● use technology purposefully to create, organise, store, manipulate and retrieve digital content		Pupils should be taught to ● select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information			
	SPR 2 To label objects To identify that objects can be counted To describe objects in different ways To count objects with the same properties To compare groups of objects To answer questions about groups of objects	SPR 2 To recognise that we can count and compare objects using tally charts To recognise that objects can be represented as pictures To create a pictogram To select objects by attribute and make comparisons To recognise that people can be described by attributes To explain that we can present information using a computer	SPR 2 To create questions with yes/no answers To identify the attributes needed to collect data about an object To create a branching database To explain why it is helpful for a database to be well structured To plan the structure of a branching database To independently create an identification tool	SPR 2 To explain that data gathered over time can be used to answer questions To use a digital device to collect data automatically To explain that a data logger collects 'data points' from sensors over time To recognise how a computer can help us analyse data To identify the data needed to answer questions To use data from sensors to answer questions	SPR 2 To use a form to record information To compare paper and computer-based databases To outline how you can answer questions by grouping and then sorting data To explain that tools can be used to select specific data To explain that computer programs can be used to compare data visually To use a real-world database to answer questions	SPR 2 To create a data set in a spreadsheet To build a data set in a spreadsheet To explain that formulas can be used to produce calculated data To apply formulas to data To create a spreadsheet to plan an event To choose suitable ways to present data
	Grouping data	Pictograms	Branching databases	Data logging	Flat-file databases	Spreadsheets
	Talk buttons/dictation tools	J2data www.j2e.com (Just2easy)	J2data.com www.j2e.com (Just2easy)	Data Loggers	https://www.j2e.com/j2data/	Excel/Google Sheets