



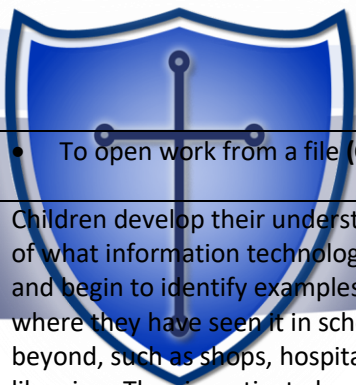
All Souls' Computing Curriculum is structured into units of work. All learning outcomes of the Computing Curriculum can be described using the National Centre for Computing Education's computing taxonomy of ten strands, ordered alphabetically as follows:

Algorithms (AL) — Be able to comprehend, design, create, and evaluate algorithms	Computer networks (NW) — Understand how networks can be used to retrieve and share information, and how they come with associated risks	Computer systems (CS) — Understand what a computer is, and how its constituent parts function together as a whole
Creating media (CM) — Select and create a range of media including text, images, sounds, and video	Data and information (DI) — Understand how data is stored, organised, and used to represent real-world artefacts and scenarios	Design and development (DD) — Understand the activities involved in planning, creating, and evaluating computing artefacts
Effective use of tools (ET) — Use software tools to support computing work	Impact of technology (IT) — Understand how individuals, systems, and society as a whole interact with computer systems	Programming (PG) — Create software to allow computers to solve problems
Safety and security (SS) — Understand risks when using technology, and how to protect individuals and systems		

Taught units are also defined as falling under one of four themes, which are used in this progression document to demonstrate how skills are progressively developed throughout our computing curriculum:

	Computing Systems and Networks	Programming	Data and information	Creating media
NCCE's taxonomy strands	Computer systems Computer Networks	Programming Algorithms Design and development	Data and information	Creating media Design and development
	Effective use of tools Impact of technology Safety and security			

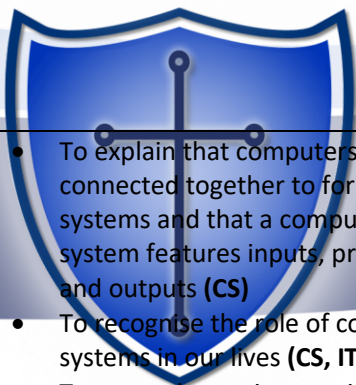
	Computer Systems and Networks	Programming	Data and information	Creating media	Safe use of technology
YEAR 1	<p>Children develop their understanding of what technology is and how it can help them in their everyday lives. They start to become familiar with the components of a computer by developing their keyboard and mouse skills.</p> <ul style="list-style-type: none"> To identify technology, say how it helps us and identify technology in the classroom (CS, IT) To identify a computer and its main parts (CS) To switch on a computer, log on, and use a mouse to click and drag (CS) To use a keyboard to type on a computer, including my name (CS, ET) To save work to a file (CS, ET) To edit text during a keyboard, moving a cursor with the arrow keys and deleting letters (CS, ET) 	<p>Children are introduced to early programming concepts – exploring individual commands with others and as part of a program. They identify what commands instruct a floor robot to do and being to predict outcomes of programs:</p> <ul style="list-style-type: none"> To explain what a given command will do and predict the outcome of a command (AL) To act out a given word, following instructions, giving directions and recalling words that can be acted out (AL IT) To combine forwards and backwards commands to make a sequence and predict the outcomes of a sequence involving these (PG) To combine four direction commands to make sequences, experimenting with turn and move commands (PG) To predict the outcome of a sequence involving up to four commands (PG) To plan a simple program, sequencing the order of commands, debugging and explaining what the programs should do (AL, PG) To find more than one solution to a problem, planning 	<p>Children are introduced to 'data' and 'information'. They learn that searching is a common operation within technology and how labelling and grouping are important aspects of this.</p> <ul style="list-style-type: none"> To label objects individually and as a group and match objects to groups (DI) To identify that objects can be counted and grouped (DI) To describe objects in different ways, including by their properties and find objects with similar properties (DI) To compare groups of objects and choose how to group these (DI) To answer questions about groups of objects and record and share what I have found (DI) 	<p>Children develop their understanding of tools used for digital painting and, drawing on the inspiration of a range of artists' work, create their own digital paintings.</p> <ul style="list-style-type: none"> To describe what different freehand tools do, drawing lines, making marks and using paint tools (CM, ET) To use the shape and line tools, representing shapes seen in other pictures and artists' work (CM, ET) To make careful choices when painting a digital picture, choosing appropriate shapes and colours (CM, ET) To explain why I chose the tools I use, showing that I know that different tools do different jobs (CM, DD, ET) To use a computer independently to paint a picture, changing colour and brush size (CM, ET) To compare painting a picture on a computer and on paper identifying the differences with each of these (CM, DD, ET) 	<ul style="list-style-type: none"> To know to seek help from an adult when they see something that is unexpected or worrying when using technology To demonstrate how to open and safely close applications on a computer To agree to follow sensible rules when using technology or the Internet



<p style="text-align: center;">Y E A R 2</p>	<ul style="list-style-type: none"> To open work from a file (CS, ET) <p>Children develop their understanding of what information technology (IT) is and begin to identify examples from where they have seen it in school and beyond, such as shops, hospitals and libraries. They investigate how IT improves our world.</p> <ul style="list-style-type: none"> To recognise the uses and features of information technology, recognizing that a computer is part of IT (CS, NW) To identify the uses of information technology in school (CS, IT, NW) To identify information technology beyond school, sorting IT by where it is found and its uses (CS, IT, NW) To explain how information technology helps us (CS, IT, NW) To recognise that choices are made when using information technology and there is a need for it to be used in different ways for different activities (CS, IT, NW) 	<p>more than one programs to get to the same place (AL PG)</p> <p>Children develop their understanding of instructions in sequences and logical reasoning to predict outcomes. Children use given commands in different orders to investigate how the order affects outcomes. They design algorithms as programs and debug them.</p> <ul style="list-style-type: none"> To describe a series of instructions as a sequence (AL) To explain what happens when we change the order of instructions (AL) To use the same instructions to create different algorithms (AL, PG) To use logical reasoning to predict the outcome of a program, comparing my prediction to the outcome (AL, PG) To explain that programming projects can have code and artwork (AL, DD, PG) To design an algorithm to meet a goal and explain what it should achieve (AL, DD) To create and debug a program that I can write, planning algorithms for each part, putting it together and testing and debugging each part (AL, DD, PG) 	<p>Children begin to understand what the term data means and how data can be collected in the form of a tally chart. They learn the term 'attribute' and use this to help them to organize data. They present this data in the form of pictograms and block diagrams and use this presented data to answer questions.</p> <ul style="list-style-type: none"> To recognise that we can count and compare objects using tally charts, recording data in this way and comparing totals (DI) To recognise that objects can be represented as pictures and use pictograms to answer questions (DI, ET) To create pictograms from tally charts and explain what this shows (DI, ET) To select objects by attribute and make comparisons (DI, ET) To answer 'more than'/'less than' and 'most'/'least' questions about an attribute (DI, ET) To recognise that people can be described by attributes, choose suitable attributes to compare people and collect data relating to these attributes (DI, ET) To explain that we can present information using a computer (DI, ET) 	<p>Children learn that different devices can be used to capture photographs and gain experience of capturing, editing and improving images.</p> <ul style="list-style-type: none"> To use a digital device to take a photograph, explaining this process (CM, CS) To recognise some devices that can be used to take photographs (CM, CS) To make choices when taking a photograph, such as in landscape or portrait and explain these choices (CM, CS, ET) To describe what makes a good photograph, suggested what may have gone wrong and the importance of retaking photos (CS, DD) To decide how photographs can be improved and explain why a picture might be unclear (CM, DD, ET) To use tools to change an image, explaining my choices (CM, ET) To recognise that photos can be changed and some of the ways in which this can be done (CM, ET) 	<ul style="list-style-type: none"> Give examples of why some information should not be shared and what constitutes 'personal' information To explain how to use information technology safely and say how rules keep me safe, including the school's acceptable use agreement To know to seek help from an adult when they see something that is unexpected or worrying To recognise that some photos that I see may be real and others may have been changed To suggest why people change photographs To understand why it is important to ask for consent what taking or sharing a photo of someone To demonstrate how to safely log on and off from websites and why it is important to do so To use key vocabulary to demonstrate knowledge and understanding : safe, meet, accept, reliable, tell, online, trusted, adult, information, safety, personal, key, question, tell, safe, share, stranger, danger, internet.
<p style="text-align: center;">Y E A R 3</p>	<p>Children develop their understanding of digital devices through exploring inputs, processes and outputs. They compare digital and non-digital devices and consider computer networks.</p> <ul style="list-style-type: none"> To explain how digital devices function, by accepting inputs, following a process, and producing outputs (CS) To identify input and output devices and classify these (CS) To recognise how digital devices can change the way in which we work, comparing digital to non-digital tools (CS, IT) To explain how a computer network can be used to share information (CS, NW) To explore how digital devices can be connected and how information can be passed between devices (CS, NW) To recognise the physical components of a network and identify how these are connected 	<p>Children are introduced to Scratch and the concept of sequencing programming. Children learn how to select blocks for motion, sounds and events and using these, create programs.</p> <ul style="list-style-type: none"> To explore a programming environment and recognise this as software used to create programs (ET, PG) To identify that commands have an outcome and that a sprite can be controlled by the commands that are chosen (PG) To explain that a program has a start and that commands are connected through sequence (PG) To recognise that a sequence of commands can have an order and that commands can be combined to create a desired outcome (PG) To change the appearance of a project and make artistic choices (PG) To create a project from a task description, identifying the objects and commands that are needed and implementing an algorithm as code (AL, CM, DD, PG) To create a program to move a sprite in four directions (ET, PG) To adapt a program to a new context To add features to a program using blocks (PG) 	<p>Children develop their understanding of databases and of what a branching database is. They use yes/no questions to gain an understanding of what attributes are and how they can be used to sort groups of objects. Children create on-screen branching databases and associated identification tools to test their database.</p> <ul style="list-style-type: none"> To create questions with yes/no answers to create two groups of objects separated by one attribute (DI) To identify the attributes needed to collect data about an object (DI) To create a branching database, choosing yes/no questions and testing this to see if it works (DI, ET) To explain why it is helpful for a database to be well structured, comparing two branching database structures (DD, DI, ET) To plan the structure of a branching database, creating questions that will enable objects to be uniquely identified (DI, ET) To independently create an identification 	<p>Children use a range of techniques to create a stop-frame animation before applying these to a story-based animation. Children add other types of media to their animations, such as music and text.</p> <p>Children use desktop publishing software and consider choices of font size colour and type to edit and improve documents. They are also introduced to the ideas of 'templates', 'orientations' and 'placeholders' to create print documents.</p> <ul style="list-style-type: none"> To explain that animation is a sequence of drawings or photographs and liken this to a flip-book (CM, ET) To relate animated movement with a sequence of images, explaining why, in a stop-frame animation, small changes are needed for each frame (CM, ET) To predict what an animation may look like (CM, ET) To plan an animation, using a story board and breaking it down so that it is achievable on screen (CM, DD) To identify the need to work carefully and consistently when creating animation, reviewing and evaluating frames to check work (CM, DD, 	<ul style="list-style-type: none"> To recognise that information is shared across a network To explain why a network needs protecting To reflect on their own digital footprint, knowing what this means, and behaviour online To know that is appropriate and inappropriate behavior on the internet and recognise the term cyberbullying To know to seek help from an adult when they see something that is unexpected or worrying



	<p>(CS, NW)</p>	<ul style="list-style-type: none"> To identify and fix bugs in a program, modifying and improving a program (DD, PG) To design and create a maze-based challenge (DD, PG) 	<p>tool (DD, DI)</p> <ul style="list-style-type: none"> To suggest real-world uses for branching databases (DD, DI) 	<p>ET)</p> <ul style="list-style-type: none"> To review and improve an animation, evaluating others' work and describing how to improve own work (CM, DD, ET) To add other media to an animation and evaluate its overall quality and impact (CM, DD, ET) To recognise how text and images convey information (CM) To edit text and layout, changing font style, size and colours for a given purpose (CM, ET) To choose appropriate page settings including orientation, use of templates and placeholders (CM, ET) To add content to a desktop publishing publication, making choices about position and appropriate revisions (CM, ET) To consider how different layouts can suit different purposes (CM, DD, ET) To consider the benefits of desktop publishing (CM, DD, ET, IT) 	
<p>Y E A R 4</p>	<p>Children apply their knowledge and understanding of networks to appreciate the Internet as a network of networks. They learn that the World Wide Web is part of the internet. They evaluate online content.</p> <ul style="list-style-type: none"> To describe how networks physically connect to other networks so that information can be shared (NW) To describe the Internet as a network of networks (NW) To recognise how networked devices make up the internet and that the Internet is used to provide many services (NW) To outline how websites can be shared via the World Wide Web (WWW) and describe how these can be accessed (CM, NW) To describe how content can be added and accessed on the World Wide Web (WWW) (CM, NW) To recognise how the content of the WWW is created by people (NW) 	<p>Children learning about repetition and loops within programming. Children create programs through planning, modifying and testing commands to create shapes and patterns.</p> <ul style="list-style-type: none"> To recognise that accuracy in programming is important (AL, PG) To create a program in text-based language, writing algorithms to produce an outcome (ET, PG) To explain what 'repeat' means - including identifying everyday tasks that include repetition as part of a sequence and within programming (AL, PG) To modify a count-controlled loop to produce a given outcome, identifying the impact of changing variables (PG) To decompose a task into smaller steps (AL, PG) To create a program that uses count-controlled loops to produce a given outcome, testing and debugging as necessary (PG) To develop a design that includes two or more loops which run at the same time (DD, PG) To modify an infinite loop in a given program (PG) 	<p>Children consider how and why data is collected over time. They consider the senses that humans use to experience the environment and compare this to how digital devices have input devices called sensors to do the same. Children collect and access data captured over time and review and analyse this data.</p> <ul style="list-style-type: none"> To explain that data gathered over time can be used to answer questions and suggest data that can be gathered (DI) To use a digital device to collect data automatically, recognizing that a device uses sensors to collect this data (CS, DI, ET) To explain that a data logger collects 'data points' from sensors over time and that the 'interval' used to collect data can be changed (CS, DI, ET) To recognise how a computer can help use to analyse data through how it is displayed and sorted (DI, ET) To identify the data needed to answer questions (CS, DI, ET) To use data from sensors to answer questions, drawing conclusions from the data that has been collected (CS, DI) 	<p>Children identify input and output devices required to work with sound digitally. Children use software to produce a podcast, recording and editing their work by adding multiple tracks. Children evaluate their own and others' work.</p> <ul style="list-style-type: none"> To identify that sound can be recorded and that a device is required for this (CS, DI) To explain that audio recordings can be edited and suggests ways that this can be done (CM, CS, DD, ET) To recognise the different parts of creating a podcast including the need to add together different sounds and recordings (CM, DD, DI, ET) To apply audio editing skills independently (CM, ET) To combine audio to enhance a podcast project (CM, ET) 	<ul style="list-style-type: none"> To discuss why a network needs protecting To explain that there are rules to protect content on the Internet To suggest who owns the content on websites To explain that not everything on the World Wide Web is true To explain why I need to think carefully before I share or re-share content To explain why some information I find online may not be honest, accurate or legal To demonstrate an understanding of age-appropriate websites and adverts and what 'age ratings' are To understand content ownership and that the person who records a sound can say who is allowed to use it To use key vocabulary relating to e-safety: safe, meet, accept, reliable, tell, online, trusted, adult, information, safety, personal, internet, world wide web, communicate, message, social media, email, password, cyberbullying/bullying, plagiarism, profiles, account, private, public.
<p>Y E A R</p>	<p>Children develop their understanding of computer systems and how information is transferred between systems and devices. They explain the input, output and process aspects of a variety of different real-world systems.</p>	<p>Children use physical computing to explore the concept of selection in programming using Crumble controllers and the Crumble programming environment. They learn how to connect and program components and build upon their existing programming knowledge of repetition and conditions to further this into the if, then structure.</p>	<p>Children look at how a flat-file database can be used to organise data in records. They use tools within a database to order and answer questions about data. They create graphs and charts from their own data to help to solve problems.</p>	<p>Children learn how to create short videos. They develop the skills of capturing, editing and manipulating video. Children use a range of devices and software to be guided to create videos upon which they reflect and evaluate.</p> <p>Children create vector drawings using different tools</p>	<ul style="list-style-type: none"> To know how search engines filter inappropriate content To recognise that not all content on the internet is appropriate for everyone and that using good search terms increases the chances of appropriate responses To know the importance of sharing if you



<p>5</p>	<ul style="list-style-type: none"> To explain that computers can be connected together to form systems and that a computer system features inputs, processes and outputs (CS) To recognise the role of computer systems in our lives (CS, IT) To use and experiment with search engines, comparing results from different search engines (NW) To describe how search engines select results (IT, NW) To explain how search results are ranked, giving examples of criteria used by search engines to rank results (ET, NW) To recognise why the order of results is important, and to whom (DD, ET, NW) 	<p>Children develop their knowledge of selection and conditions, using the if, then, else structure to select different outcomes.</p> <ul style="list-style-type: none"> To control a simple circuit connected to a computer, via a microcontroller (CS, PG) To write a programme that includes count-controlled loops to control outputs (CS, PG) To explain that a loop can stop when a condition is met, and that these conditions are either true or false (CS, PG) To explain that a loop can be used to repeatedly check whether a condition has been met (PG) To design a physical project that includes selection, describing what the project is intended to do (CS, DD) To create a program that control a physical computing project (CS, DD, PG) To test and debug a project suggesting improvements or increases in programming efficiency (PG) 	<ul style="list-style-type: none"> To use a form to record information (DI, ET) To compare paper and computer-based databases (DD, DI) To outline how you can answer questions by grouping and then sorting data (DI) To explain that tools can be used to select specific data and outline how 'AND' and 'OR' can be used to refine data selection (DI, ET) To explain that computer programs can be used to compare data visually and select appropriate charts to be displayed (DI, ET) To use a real-world database to answer questions, asking questions that need more than one field to answer and presenting my findings to others (DI, ET) 	<p>to help them to create images. They recognise that vector drawings are created using shapes and lines and that each element is called an object. Children use groups and duplication to make more complex pieces of work.</p> <ul style="list-style-type: none"> To explain what makes an effective video (CM, DD) To identify digital devices that ca record video (CM, CS) To capture video using a range of techniques, finding and using features on a recording device and experimenting with camera angles (CM) To create a story board, deciding which filming techniques to use and outlining scenes within a video (CM, DD, ET) To identify that video can be improved through reshooting and editing, knowing some of the tools that can be used to edit video (CM, ET) To evaluate video and share opinions (CM, DD, ET) To create a vector drawing by combining shapes (CM, ET) To use drawing tools to modify objects and create new images (CM, ET) To recognise that vector drawings consist of layers and use layering to create an image (CM, ET) To group objects top make them easier to work with (CM, ET) 	<p>come across content that is inappropriate or upsets and how to report such content online</p> <ul style="list-style-type: none"> To appreciate that like physical content, digital content has ownership and it is possible to 'steal' digital contant To know what a good password looks like and the importance of protecting passwords To know to seek help from an adult when they see something that is unexpected or worrying To appreciate that consent needs to be gained before taking, editing or sharing video of someone including telling them how the content will be used To consider that how people are represented online and in videos can impact their well-being and how they may be perceived/treated by others To consider 'online reputation' and how this can be affected by the content that you make, publish and share To know that the drawings and images that I create are owned by me
<p>Y E A R 6</p>	<p>Children learn how data is transferred over the Internet. They initially focus on 'addressing' before moving on to the makeup and structure of data packets. Children look at how the Internet facilitates online communication and collaboration.</p> <ul style="list-style-type: none"> To explain the importance of Internet addresses, describing how computers use addresses to access websites (ET, NW) To recognise how data is transferred across the Internet, identifying and explaining the main parts of a data packet (ET, NW) To explain how sharing information online help people to work together (ET, NW) To evaluate different ways of working together online (ET, IT, NW) To recognise how we communicate using technology (ET, NW) To evaluate different methods of online communication (DD, ET, 	<p>Children explore the concept of variable in programming through games. They learn about what variables are and relate them to real-world examples of values that can be set and changed.</p> <p>Children are introduced to the micro:bit for which they design simple programs. They transfer programs to the microcontroller for testing, refining and evaluation.</p> <ul style="list-style-type: none"> To define a 'variable' as something that is changeable (PG) To explain why a variable is used in a program and that is has a name and value (PG) To choose how to improve a program or game by using variables, using events in a program to set a variable (DD, PG) To design a project that builds upon an given example, choosing artwork, creating algorithms and explaining design choices (DD, PG) To use my design to create a project, creating a testing the code that I have written (DD, PG) To evaluate my project, suggesting ways that it could be improved and sharing it with others (DD, PG) To create a program to run on a controllable device (CS, PG) 	<p>Children are introduced to spreadsheets where they organise data into columns and rows to create a data set. They are taght the importance of formatting data to support calculations whilst being introduced to formulas. They apply these including formulas that draw on data from multiple cells. They use these spreadsheets to ask and answer questions and display information as charts.</p> <ul style="list-style-type: none"> To create a data set in a spreadsheet, collecting and entering the data (DI)B To build a data set in a spreadsheet, including applying appropriate formats to cells (DI) To explain that formulas can be used to produce calculated data (DI, ET, PG) To apply formulas to data, including those which calculate or include a range of cells (DI, ET, PG) To create a spreadsheet to plan an event (DI, ET) To choose suitable ways to present data so that questions can be answered (CM, DD, DI) 	<p>Children are introduced to the creation of websites for a chosen purpose. The identify what makes a good web page and use this information to design and evaluate their own website.</p> <p>Children develop their knowledge and understanding of using a computer to produce 3D models. They are introduced to working in a 3D space, moving, resizing and duplicating objects. They create hollow objects using placeholders and combine multiple objects to create something bigger.</p> <ul style="list-style-type: none"> To review an existing website and consider its structure, knowing that website are written in HTML (CM, DD) To plan the features of a web page, recognizing the common features and types of media (CM, DD) To recognise the need to preview pages, as it will look different in code form (CM, DD, ET) To outline the need for navigation path including using hyperlinks (CM, DD, ET) To recognise that you can work in three dimensions on a computer (CM, ET) To identify that digital 3D objects can be 	<ul style="list-style-type: none"> To recognise that communication on the Internet may not be private To recognise that how I communicate with people online will affect my online image and reputation To consider that information online may be available for many to see and for a long time To know what is meant by the term 'fair use' and be able to find copyright-free images To say why we should use copyright-free images To explain the implication of linking to content owned by others To know to seek help from an adult when they see something that is unexpected or worrying To know and use key e-safety vocabulary: spam, link, privacy, virus, scam, phishing, inbox, junk, sender, subject, secure, safe, account, online, private, social media, adverts, cyberbullying, reporting, anonymous, victim, fraud/fraudulent, policy, private/personal.



		<ul style="list-style-type: none">• To explain that selection can control the flow of a program (CS, PG)• To update a variable from a user input (CS, PG)• To use a conditional statement to compare a variable to a value (CS, PG)• To design and develop a project that uses inputs and outputs on a controllable device (CS, DD, PG)		<p>modified CM, ET)</p> <ul style="list-style-type: none">• To recognise that objects can be combined in a 3D model (CM, ET)• To create a 3D model for a given purpose (CM, ET)• To plan my own 3D model (CM, DD, ET)• To create my own digital 3D model (CM, DD, ET)	
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