Computing: Progression Mapped by Strand

Intention

As a church school we acknowledge that all of our pupils are significant to God. We therefore value each child's unique personality and aim to develop their character, talents and abilities to the fullest in His name. Our computing curriculum is an intrinsic part of this, unlocking the potential of each child, so that they can flourish. This is also in keeping with our status as a UNICEF Rights Respecting School and fulfils our obligations under Article 29 of the United Nations Convention on the Rights of the Child.

We believe we must prepare children for life in a digital world and the teaching of computer science is key to this. We aim to develop their computational thinking, so they are better able to conceptualise, understand and use computer-based technology. Children that think in this way are better equipped to problem solve, a skill that can be applied to many areas of the curriculum and more broadly in life.

One of our Christian values is Respect and we use this to frame our conversations regarding how to communicate appropriately on the various digital platforms. Using technology safely is also a strong feature in our curriculum.

Computing Systems & Networks

Our curriculum is designed to teach children the principles of information and computation, so that they know how digital systems work and how to apply this to programming.

By the end of KS1 children should:	**By the end of KS2 children should:**
Be able to identify examples of technology around them	Understand how computer networks work, including the internet
Be able to name the main parts of a computer	Understand that information is created by people and that this has implications
Be able to use a mouse and keyboard and be able to locate, open and save files	Understand how information is shared and used
Understand that technology should be used safely	Are able to evaluate the information they receive
Understand that they should behave as respectfully when using technology as they do in other areas of life	Are able to evaluate the effectiveness of different ways of working and communicating online

Programming

Each year group has two programming units. These are the only units that must be taught in the given order to ensure that skills are taught progressively. In KS1 children focus on developing computational thinking by giving and following instructions in real-world situations before they move onto programming simple computers e.g. floor robots. In KS2 children explore a variety of programming environments and begin to write more complex algorithms/programs. They begin to connect and control more input and output devices.

By the end of KS1 children should:	By the end of KS2 children should:
Understand that programs are a series of instructions	Be able to program sequences of actions using blocks
Start to debug simple programs of their own	Be able to use infinite and count-controlled loops to instructions
Use logical reasoning to predict outcomes	Be able to use selection (decision making) in programs to produce different outcomes
Change parts of a given program to achieve a specific outcome	Be able to use sensors e.g. light to control the flow of actions in an algorithm or program
Create algorithms and related artwork of their own	Be able to use variables in programs to produce different outcomes

Creating Media

Computing is also a practical subject, in which invention and resourcefulness are encouraged. Our curriculum gives children opportunities to apply their knowledge and skills to creating a variety of purposeful products, from digital paintings to podcasts. We aim to teach children how to navigate information and communication technology and use it to express themselves and develop ideas. Each year group has two units that focus on creating digital media.

By the end of KS1 children should:	By the end of KS2 children should:
Be able to use digital painting software to create an image	Be able to use manual methods and software to create a stop frame animation
Be able to type and manipulate text in a word processor	Be able to combine text and images in different layouts for different purposes
Be able to take a digital photograph	Be able to use photo-editing software to manipulate digital images
Be able to use software to create simple musical compositions	Be able to record sound digitally for a podcast
Be able to compare the experience of completing tasks by hand and using a computer	Be able to represent objects in vector drawings
Begin to evaluate the media they create	Be able to add sound to moving images in a video
	Be able to use CAD to represent a 3d model

	Be able to create a webpage that can be clearly navigated whilst taking into account copyright and the implications of linking to someone else's content

Data & Information

We live in a data-rich world and it is important children are data literate if they are to thrive. Data skills include, planning what data to collect, collecting, analysing and presenting. These skills are also embedded in the mathematics and science curriculums and to a certain extent in Design & Technology. Children are also encouraged to consider whether it is safe or desirable to share personal data without consideration.

By the end of KS1 children should:	By the end of KS2 children should:
Understand what is meant by data	Be able to suggest sensible questions that can be used to identify objects in a branching database
Be able to identify attributes that will enable them to compare and group objects	Be able to use data loggers to collect various types of data over a period of time in order to answer questions
Be able to organise data so it is easier to use	Be to create a database from information they have collected and use it to answer questions
Represent data in simple charts	Be able to use formulas in a spreadsheet to produce calculated data
	Be able to represent data in a variety of ways

Implementation

We follow the curriculum from Teach Computing and each year group studies one computing unit per half-term. We use the Teach Computing curriculum for the following practical reasons:

- It provides clear lesson plans for teachers with obvious progression across year groups
- The lessons can be used with software/hardware that we already have or is easy to source
- Resources and software from Purplemash can be used to compliment the plans
- It provides a good balance between the teaching of computing science, digital literacy and creating different types of media
- It has clear links to other curriculum areas that teachers can exploit, such as mathematics, science and design & technology
- Many of the Teach Computing units also dovetail neatly with our existing Art & Design and Design & Technology curricula

We continue to work in partnership with the City Learning Centre (CLC). KS2 classes usually benefit from 2 workshops per year. These often focus on teaching aspects of computing that we do not have the equipment or software for, or areas where teacher confidence is low. We also reserve some workshops for enrichment projects. For example, the CLC supported a Year 4 class with equipment and expertise when creating an animation for The National Gallery's 'Take One Picture' project. This animation was selected to be shown in the exhibition at The National Gallery.

Impact

Formative assessment opportunities are detailed in each lesson plan, including opportunities for children to self-assess against the success criteria. Summative assessment activities are either provided with the lesson plans or recommended. The objectives in our progression map have been loaded into Integris and teachers are expected to assess the children against them either at the end of each unit or end of each term.

Computing Progression Map 20-21

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computing systems and networks	**By the end of each year, children should be able:**					
	To identify technology	To recognise the uses and features of information technology	To explain how digital devices function	To describe how networks physically connect to other networks	To explain that computers can be connected together to form systems	To identify how to use a search engine
	To identify a computer and its main parts	To identify information technology in the home	To identify input and output devices	To recognise how networked devices make up the internet	To recognise the role of computer systems in our lives	To describe how search engines select results
	To use a mouse in different ways	To identify information technology beyond school	To recognise how digital services can change the way we work	To outline how websites can be shared via the World Wide Web	To recognise how information is transferred over the internet	To explain how search results are ranked
	To use a keyboard to type	To explain how information technology benefits us	To explain how a computer network can be used to share information	To describe how content can be added and accessed on the World Wide Web	To explain how sharing information online lets people in different places work together	To recognise why the order of results is important, and to whom
	To use a keyboard to edit text	To show how to use information technology safely	To explore how digital devices can be connected	To recognise how the content of the World Wide Web is created by people	To contribute to a shared project online	To recognise how we communicate using technology
	To create rules for using technology responsibly	To recognise that choices are made when using information technology	To recognise the physical components of a network	To evaluate the consequences of unreliable content	To evaluate different ways of working together online	To evaluate different methods of online communication

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Creating Media	**By the end of each year, children should be able:**					
	To describe what different freehand tools do (painting program e.g. 2paint a picture)	To know what devices can be used to take photographs	To explain that animation is a sequence of drawings or photographs	To identify that sound can be digitally recorded	To identify that drawing tools can be used to produce different outcomes	To use a computer to create and manipulate three-dimensional (3D) digital objects
	To use the shape tool and the line tools (painting program e.g. 2paint a picture)	To use a digital device to take a photograph	To relate animated movement with a sequence of images	To use a digital device to record sound	To create a vector drawing by combining shapes	To compare working digitally with 2D and 3D graphics
	To make careful choices when painting a digital picture	To describe what makes a good photograph	To plan an animation	To explain that a digital recording is stored as a file	To use tools to achieve a desired effect	To construct a digital 3D model of a physical object
	To explain why they chose the painting tools they used	To decide how photographs can be improved	To identify the need to work consistently and carefully	To explain that audio can be changed through editing	To recognise that vector drawings consist of layers	To identify that physical objects can be broken down into a collection of 3D shapes
	To use a computer independently to paint a picture	To use tools to change an image	To review and improve an animation	To show that different types of audio can be combined and played together	To group objects to make them easier to work with	To design a digital model by combining 3D objects
	To compare painting a picture on a computer and on paper	To recognise that images can be changed	To evaluate the impact of adding other media to an animation	To evaluate editing choices made	To evaluate my vector drawing	To develop and improve a digital 3D model
	To use a computer to write	To say how music can make us feel	To recognise how text and images convey information	To explain that digital images can be changed	To recognise video as moving pictures which include audio	To review an existing website and consider its structure

	To add and remove text on a computer	To identify that there are patterns in music	To recognise that text and layout can be edited	To change the composition of an image	To identify digital devices that can record video	To plan the features of a web page
	To identify that the look of text can be changed on a computer	To describe how music is made from a series of notes	To choose appropriate page settings	To describe how images can be changed for different uses	To capture video using a digital device	To consider the ownership and use of images (copyright)
	To make careful choices when changing text	To describe how music can be used in different ways	To add content to a desktop publishing publication	To make good choices when selecting different tools	To recognise the features of an effective video	To recognise the need to preview pages
	To explain why they used the writing tools that they chose	To create music for a purpose	To consider how different layouts can suit different purposes	To recognise that not all images are real	To identify that video can be improved through reshooting and editing	To outline the need for a navigation path
	To compare writing on a computer and writing on paper	To review and refine our computer work	To consider the benefits of desktop publishing	To evaluate how changes can improve an image	To consider the impact of the choices made when making and sharing a video	To recognise the implications of linking to content owned by other people

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Data & Information	**By the end of each year, children should be able:**					
	To label objects	To recognise that we can count and compare objects easily using charts	To create questions with yes/no answers	To explain that data gathered over time can be used to answer questions	To use a form to record information	To identify questions which can be answered using data
	To identify that objects can be counted	To recognise that objects can be represented as pictures	To identify the object attributes needed to collect relevant data	To use a digital device to collect data automatically	To compare paper and computer-based databases	To explain that objects can be described using data
	To describe objects in different ways	To create a pictogram	To create a branching database	To explain that a data logger collects 'data points' from sensors over time	To apply their knowledge of a database to ask and answer real-world questions	To explain that formula can be used to produce calculated data
	To count objects with the same properties	To select objects by attribute and make comparisons	To explain why it is helpful for a database to be well structured	To use data collected over a long duration to find information		To apply formulas to data, including duplicating
	To compare groups of objects	To recognise that people can be described by attributes	To identify objects using a branching database	To identify the data needed to answer questions		To create a spreadsheet to plan an event
	To answer questions about groups of objects	To explain that we can present information using a computer	To compare information shown in a pictogram with a branching database	To use collected data to answer questions	To explain that tools can be used to select data to answer questions	To choose suitable ways to present data

Strand	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Programming	**By the end of each year, children should be able:**					
	To explain what a given command will do	To describe a series of instructions as a sequence	To explore a new programming environment	To identify that accuracy in programming is important	To control a simple circuit connected to a computer	To define a 'variable' as something that is changeable
	To act out a given word	To explain what happens when we change the order of instructions	To identify that each sprite is controlled by the commands chosen	To create a program in a text-based language	To write a program that includes count-controlled loops	To explain why a variable is used in a program
	To combine forwards and backwards commands to make a sequence	To use logical reasoning to predict the outcome of a program (series of commands)	To explain that a program has a start	To explain what 'repeat' means	To explain that a loop can stop when a condition is met, e.g. number of times	To choose how to improve a game by using variables
	To combine four direction commands to make sequences	To explain that programming projects can have code and artwork	To recognise that a sequence of commands can have an order	To modify a count-controlled loop to produce a given outcome	To conclude that a loop can be used to repeatedly check whether a condition has been met	To design a project that builds on a given example
	To plan a simple program	To design an algorithm	To change the appearance of a project	To decompose a program into parts	To design a physical project which includes selection	To use their own design to create a project
	To find more than one solution to a problem	To create and debug a program that I have written	To create a project from a task description	To create a program that uses count-controlled loops to produce a given outcome	To create a controllable system which includes selection	To evaluate a project that they have made
	To choose a command for a given purpose	To explain that a sequence of commands has a start	To explain how a sprite moves in an existing project	To develop the use of count-controlled loops in a different programming environment	To explain how selection is used in computer programs	To create a program to run on a controllable device

	To show that a series of commands can be joined together	To explain that a sequence of commands has a outcome	To create a program to move a sprite in four directions	To explain that in programming there are infinite loops and count-controlled loops	To relate that conditional statement connects a condition to an outcome	To explain that selection can control the flow of a program
	To identify the effect of changing a value	To create a program using a given design	To adapt to a new context	To develop a design which includes two or more loops which run at the same time	To explain how selection directs the flow of a program	To update a variable with a user input
	To explain that each sprite has its own instructions	To change a given design	To develop a program by adding features	To modify an infinite loop in a given program	To design a program which uses selection	To use a conditional statement to compare a variable to a value
	To design parts of a project	To create a program using my own design	To identify and fix bugs in a program	To design a project that includes repetition	To create a program which uses selection	To design a project that uses inputs and outputs on a controllable device
	To use an algorithm to create a program	To decide how my project can be improved	To design and create a maze based challenge	To create a project that includes repetition	To evaluate my program	To develop a program to use inputs and outputs on a controllable device