St Paul's Cray CE Primary School
Act Justly, Love Mercy, Walk Humbly

Amadeus Primary Academies Trust
Limitless Learning Together

Computing Skills Progression

St Paul's Cray CE Primary School

'A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world.'

Computing programme of Study, DfE, 2013

In order to ensure broad and balanced coverage, we follow these principles:

- We will teach computing through all three strands (Computer Science, Information Technology and Digital Literacy).
- Ensure continuity throughout the school to ensure that experience and skills are developed in a cohesive and consistent way.
- Provide access to computers and iPads within class or in designated communal areas.
- Ensure pupils experience of a variety of well-planned, structured and progressive activities.
- Prove a cross-curricular experience with links to widen children's knowledge of the capability of computing including safe use of the Internet and other digital equipment.
- Provide pupils with the opportunities for children to recognize the value of computing and ICT in their everyday lives and their future working life as active participants in a digital world.

By doing this we will fulfil the requirements of the National Curriculum.

<table>
<tr><th colspan="3">FOUNDATION STAGE</th></tr>
<tr><td colspan="3">Learning Experiences:
Programming Bee Bots
Creating art on the interactive whiteboards.
Using simple apps on the iPads.
Listening and responding to audio.
Taking and using pictures.
Following instructions
Using video cameras
Collaborative writing, reading and accessing digital text e.g. story book or email.</td></tr>
<tr><td colspan="3">ELG:
Be confident to try new activities and show independence, resilience and perseverance in the face of challenge.
Explain the reasons for rules, know right from wrong and try to behave accordingly.
Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.</td></tr>
<tr><td>Personal, Social and Emotional Development</td><td>Physical Development</td><td>Expressive Arts and Design</td></tr>
<tr><td>Show resilience and perseverance in the face of a challenge.

Know and talk about the different factors that support their overall health e.g. amount of screen time.</td><td>Develop their fine motor skills so they can use a range of tools competently, safely and confidently.</td><td>Explore, use and refine a variety of artistic effects to express their ideas and feelings.</td></tr>
</table>

YEAR 1		
Learning Experiences		
Autumn	**Spring**	**Summer**
Programming simple instructions into BeeBots. Using Brush Redeux to recreate famous artists' work.	Making music with Garageband. Making movies using iMovie – link with food tech in DT.	Using Book Creator to make a book about our school. Using Poplit to organise data.

KS1 National Curriculum Areas of Study:

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
- use technology purposefully to create, organise, store, manipulate and retrieve digital content
- recognise common uses of information technology beyond school
- use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies

Computer Science	Information Technology	Digital Literacy
Problem Solving Programming Logical Thinking	Creating Content Searching	E-Safety Using IT Beyond The School
C.1.1.1. Understand what algorithms are by understanding that algorithms are sequences of instructions in everyday contexts. **C.1.1.2 Understand how algorithms are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions** by creating a Blue-Bot (or similar) program using a number of steps in order before pressing the Go button. **C.1.2.1. Create and debug simple programs** by giving a sequence of instructions to a floor turtle. **C.1.3.1. Use logical reasoning to predict the behaviour of simple programs** by explaining what they think a program will do.	**C.1.1.1. Use technology purposefully to organise, store and retrieve digital content** by using a range of digital technologies to store and access digital content. These might include laptop computers, tablets, smartphones, digital cameras, video cameras and audio recorders. **C.1.1.2. Use technology purposefully to create and manipulate digital content** by creating their own original digital content using a range of technologies. Projects might include videoing one another cooking, developing an eBook or an audiobook, creating a greetings card.	**C.1.1.1. Use technology safely and respectfully** by understanding that they need to keep safe when using digital technology. E.g. They should know to use filtered Safe Search when looking for images on the web and that they should close the lid of a laptop (or turn over a tablet) and alert an adult if they come across unsuitable content. **C.1.1.2. Keeping personal information private** by being aware that information stored on the web or transmitted via the Internet is available to other people. E.g. They should know that the images they find online can be found by others too. **C.1.1.3. Identify where to go for help and support when they have concerns about content or contact on the Internet or other online technologies** by knowing to close their laptop lid or turn their tablet over if they find content, such as inappropriate images, which might disturb them or other pupils. They should know to tell their teacher or their parents/carers if this happens. **C.1.2.1. Recognise common uses of information technology beyond school** by mentioning some of the ways in which IT is used to communicate beyond school. E.g. They might know that some people use social media such as Facebook, email, video calls or online greetings to say happy birthday to their friends.

YEAR 2		
Learning Experiences:		
Autumn	**Spring**	**Summer**
Programming using Scratch Jr Working out rules using Scratch.	Using iPhotos to take and edit photos Using Google Slides/Google to research an present a topic	Using Stop Motion Studio to create a stop animation. Using Google Docs to collect data on minibeasts.

KS1 National Curriculum Areas of Study:

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
- use technology purposefully to create, organise, store, manipulate and retrieve digital content
- recognise common uses of information technology beyond school
- use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies

Computer Science	Information Technology	Digital Literacy
Problem Solving Programming Logical Thinking	Creating Content Searching	E-Safety Using IT Beyond The School
C.2.1.1. Understand what algorithms are by understanding algorithms as sequences of instructions or sets of rules in everyday contexts. **C.2.1.2. The pupil can understand how algorithms are implemented as programs on digital devices, and that programs execute by following precise and unambiguous** by creating programs as sequences of instructions when programming on screen. Their program could be written using simple programming apps (such as ScratchJr), perhaps using pre-prepared blocks and sprites. **C.2.2.1. Create and debug simple programs by creating a simple program on screen (e.g. using ScratchJr) with a particular goal or purpose in mind (e.g. moving a sprite from one place to another).** **C.2.3.1. Use logical reasoning to predict the behaviour of simple programs** by giving logical explanations of what a program will do under given circumstances, including some attempt at explaining why it does what it does.	**C.2.1.1. Use technology purposefully to organise, store and retrieve digital content** by using a range of digital technologies to retrieve, organise and store digital content. Technologies will typically include laptop computers, tablets and smartphones with access to the Internet, but the pupil might also be expected to use digital cameras, video cameras and audio recorders (or the equivalent apps on a tablet or smartphone). **C.2.1.2. Use technology purposefully to create and manipulate digital content** by creating and editing their own original digital content using a range of technologies. Projects might include digital photography, creating image-based presentation slides, composing an email and creating simple charts	**C.2.1.1. Use technology safely and respectfully** by knowing that they need to keep themselves safe when using digital technology. E.g. They should know that not all games are suitable for pupils, that they should close the lid of a laptop (or similar action) if they find inappropriate images. **C.2.1.2. Keeping personal information private** by being aware that information stored on the web, or transmitted via the Internet, is available to other people. E.g. They should know that photos they take and upload can be seen by anyone who has the right username and password **C.2.1.3. Identify where to go for help and support when they have concerns about content or contact on the Internet or other online technologies** by knowing to close their laptop lid or turn their tablet over if they find content which might disturb them or other pupils. They should know to tell their teacher or their parents/carers if this happens. **C.2.2.1. Recognise common uses of information technology beyond school by** mentioning some of the ways in which IT is used to communicate beyond school. E.g. The pupil might know that adults can share work and discuss ideas in online communities; that photos can be shared easily using digital technology; that the web is made up of information shared by people.

YEAR 3

Learning Experiences:

Autumn	Spring	Summer
Using Scratch to make an animation. Using Scratch/Snap! To debug programs.	Using iMovie to record video using a green screen. Using Google Slides to create a presentation about ourselves.	Using Google Sites to create a Wiki page. Using Google Sheets to collect and analyse data.

KS2 National Curriculum Areas of Study:

Pupils should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing 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
- 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
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- 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
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Computer Science	Information Technology	Digital Literacy
Problem Solving Programming Logical Thinking	Creating Content Searching	E-Safety Using IT Beyond The School
C.3.1.1. Design, write and debug programs that accomplish specific goal by designing and writing a program using a block language, without user interaction. **C.3.1.2. Controlling or simulating physical system** by exploring simulations of physical systems on screen e.g. a bouncing ball **C.3.1.3: Solve problems by decomposing them into smaller parts** by planning a project. **C.3.2.1. Use sequence, selection and repetition in programs; work with variables** by using simple sequences in a program in the form of commands or blocks. **C.3.2.2. Work with various forms of input and output** by writing a program to produce an output on the screen. **C.3.3.1. Use logical reasoning to explain how some simple algorithms work** by explaining how a sequence works. **C.3.3.2. Use logical reasoning to detect and correct errors in algorithms and programs.** **C.3.3.3. Understand computer networks including the Internet.** **C.3.4.1. Understand how networks can provide multiple services, such as the World Wide Web.**	**C.3.1.1. Select, use and combine a variety of software (including Internet services) on a range of digital devices** by using a range of programs on a computer. **C.3.1.2. Design and create a range of programs, systems and content that accomplish given goals.** **C.3.1.3. Collecting, analysing, evaluating and presenting data and information** by collecting and presenting information to an audience. **C.3.2.1. Use search technologies effectively** by searching for information from one site. **C.3.2.2. Appreciate how search results are selected and ranked** by understanding that websites appear due to the number of key words used.	**C.3.1.1. Use technology safely, respectfully and responsibly** **C.3.1.2. Recognise acceptable/unacceptable behaviour online.** **C.3.1.3. Know a range of ways to report concerns and inappropriate behaviour** by knowing who to talk to. **C.3.1.X. Be discerning in evaluating digital content** by choosing which websites are helpful. **C.3.1.4. Understand the opportunities networks offer for communication and collaboration** by using email.

YEAR 4

Learning Experiences:

Autumn	Spring	Summer
Using Scratch to produce an educational game. Using Micro:Bit to explore coding.	Creating music in GarageBand. Using Wordpress/Blogger to share an experience/opinion.	Using Inkscape to make geometrical art. PowerPoint to measure and present the weather.

KS2 National Curriculum Areas of Study:

Pupils should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing 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
- 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
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- 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
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Computer Science	Information Technology	Digital Literacy
Problem Solving Programming Logical Thinking	Creating Content Searching	E-Safety Using IT Beyond The School
C.4.1.1. Design, write and debug programs that accomplish specific goals by designing and writing a program using a block language to a given brief, including simple interaction. **C.4.1.2. Controlling or simulating physical systems** by designing a simple physical system on screen. **C.4.1.3. Solve problems by decomposing them into smaller parts** by working as part of a team on a project. **C.4.2.1. Use sequence, selection and repetition in programs; work with variables** by using sequence and repetition in a program e.g. Scratch. **C.4.2.2. Work with various forms of input and output** e.g. by designing a game in Scratch that requires a typed answer an onscreen output. **C.4.3.1. Use logical reasoning to explain how some simple algorithms work** by explaining an algorithm in their own words. **C.4.3.2. Use logical reasoning to detect and correct errors in algorithms and programs** by finding errors in a program. **C.4.3.3. Understand computer networks including the Internet** by understanding the internet transmits packets of data. **C.4.4.1. Understand how networks can provide multiple services, such as the World Wide Web.**	**C.4.1.1. Select, use and combine a variety of software (including Internet services) on a range of digital devices** by using multiple programs. **C.4.1.2. Design and create a range of programs, systems and content that accomplish given goals** by designing content for a specific goal. **C.4.1.3. Collecting, analysing, evaluating and presenting data and information.** **C.4.2.1. Use search technologies effectively** by using a search engine e.g. Google effectively. **C.4.2.2. Appreciate how search results are selected and ranked** by knowing that search engines rank pages according to relevance.	**C.4.1.1. Use technology safely, respectfully and responsibly C.4.1.1. Use technology safely, respectfully and responsibly** by acting responsibly when creating content. **C.4.1.2. Recognise acceptable/unacceptable behaviour** by discussing what is acceptable and unacceptable when using a range of programs. **C.4.1.3. Know a range of ways to report concerns and inappropriate behaviour.** **C.4.1.X. Be discerning in evaluating digital content** by talking about if a web page is appropriate and truthful. **C.4.1.4. Understand the opportunities networks offer for communication and collaboration** by working collaboratively on a Wiki page.

YEAR 5

Learning Experiences:

Autumn	Spring	Summer
Using Scratch to develop an interactive game. Using Scratch to crack codes.	Using Trimple Sketchup to create a virtual space. Using Google Chrome/Sites to explore the internet and building a website.	Using Google Slides/Voice recorder to make an interactive adventure using presentation software. Using Google Street View to experience virtual reality.

KS2 National Curriculum Areas of Study:

Pupils should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing 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
- 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
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- 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
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Computer Science	Information Technology	Digital Literacy
Problem Solving Programming Logical Thinking	Creating Content Searching	E-Safety Using IT Beyond The School
C.5.1.1. Design, write and debug programs that accomplish specific goals by designing, writing and debugging a program using a block language based on their own ideas. **C.5.1.2. Controlling or simulating physical systems.** **C.5.1.3. Solve problems by decomposing them into smaller parts** by breaking a problem down into steps and plan how to solve it. **C.5.2.1. Use sequence, selection, and repetition in programs; work with variables** by working with a program such a Scratch combining multiple blocks of programming sequences and repetition. **C.5.2.2. Work with various forms of input and output** by writing a program that has keyboard and mouse input and has onscreen and audio output. **C.5.3.1. Use logical reasoning to explain how some simple algorithms work.** **C.5.3.2. Use logical reasoning to detect and correct errors in algorithms and programs.** **C.5.3.3. Understand computer networks including the Internet** by explaining how HTML and webpages work	**C.5.1.1. Select, use and combine a variety of software (including Internet services) on a range of digital devices** by using multiple forms of hardware and software to complete a goal. **C.5.1.2. Design and create a range of programs, systems and content that accomplish given goals** by creating game e.g. in Scratch with a degree of independence. **C.5.1.3. Collecting, analysing, evaluating and presenting data and information** by using a range of sources e.g. explaining how effective information on Esafety is. **C.5.2.1. Use search technologies effectively** by using filters and searching for answers to specific questions e.g. raised by research. **C.5.2.2. Appreciate how search results are selected and ranked** by cached results.	**C.5.1.1. Use technology safely, respectfully and responsibly** by responding appropriately in an online community and understanding that some information is encrypted. Password strength and security. **C.5.1.2. Recognise acceptable/unacceptable behaviour.** **C.5.1.3. Know a range of ways to report concerns and inappropriate behaviour.** **C.5.1.X. Be discerning in evaluating digital content** by deciding if content is unbiased and reliable e.g. a blog post. **C.5.1.4. Understand the opportunities networks offer for communication and collaboration** by working with classmates in a team.

YEAR 6

Learning Experiences:

Autumn	Spring	Summer
Using MakeCode to explore complex coding. Using Scratch to master algorithms and mathematical thinking.	Using digital cameras and Google Docs to create a yearbook page. Using Padlet to explore social media.	Using iMovie to create a short advert. Using a range of software and hardware to learn about AI, smart homes and machine learning.

KS2 National Curriculum Areas of Study:

Pupils should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing 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
- 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
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- 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
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Computer Science	Information Technology	Digital Literacy
Problem Solving Programming Logical Thinking	Creating Content Searching	E-Safety Using IT Beyond The School
C.6.1.1. Design, write and debug programs that accomplish specific goals by using a second programming language (e.g. other than Scratch) **C.6.1.2. Controlling or simulating physical systems** by writing and debugging a program. **C.6.1.3. Solve problems by decomposing them into smaller parts** by taking a complex program and breaking it down into smaller steps to solve. **C.6.2.1. Use sequence, selection and repetition in programs; work with variables** by creating a program including sequences of commands or blocks, repetition, selection and variables. Repetition might include exit conditions **C.6.2.2. Work with various forms of input and output** by writing a program that accepts inputs other than keyboard and mouse and produces outputs other than screen or speakers. **C.6.3.1. Use logical reasoning to explain how some simple algorithms work.** **C.6.3.2. Use logical reasoning to detect and correct errors in algorithms and programs.** **C.6.3.3. Understand computer networks including the Internet** by understanding other networks like phone networks.	**C.6.1.1. Select, use and combine a variety of software (including Internet services) on a range of digital devices** by using multiple digital devices (such as tablets and laptops or digital cameras and laptops) to achieve particular goals. The devices might include web servers, allowing them to use cloud-based applications. **C.6.1.2. Design and create a range of programs, systems and content that accomplish given goals** by planning, designing and implementing a system with multiple, interrelated components with a given goal in mind. **C.6.1.3. Collecting, analysing, evaluating and presenting data and information** by analysing numerical data and identifying patterns and trends. **C.6.2.1. Use search technologies effectively** by using a range of search engines different to Google. **C.6.2.2. Appreciate how search results are selected and ranked** by appreciating that search engines rank pages based on the number and quality of in-bound links.	**C.6.1.1. Use technology safely, respectfully and responsibly** by discussing likely and potential consequences of their actions when using digital technology in a range of contexts. **C.6.1.2. Recognise acceptable/unacceptable behaviour.** **C.6.1.3. Know a range of ways to report concerns and inappropriate behaviour** by understanding the law. **C.6.1.X. Be discerning in evaluating digital content** by forming an opinion about the effectiveness of digital content. **C.6.1.4. Understand the opportunities networks offer for communication and collaboration** by making use of an online tool to plan and carry out a collaborative project.