Computing

We aim to equip our pupils to grow to become capable, creative, critical and safe users of technology.
Our curriculum is designed to help them to:

➢ Develop their understanding of the principles and concepts of computer science and to build upon their knowledge using concrete experiences and applying them to real situations.

➢ Design, write and evaluate computer programmes methodically developing their skills and analytical thinking to solve problems.

➢ Develop and use their technological skills and knowledge to present their learning effectively and creatively, evaluating and communicating their findings and using these to inform future learning decisions.

➢ Become discerning, critical thinkers who are able to apply their understanding to solve problems.

➢ Know and demonstrate how to stay safe when working online at school, home and in the community and to be able to discuss any concerns they may have confidently and openly

The curriculum will be delivered through three main disciplines– Computer Science, Information technology and Digital Literacy.

Computing: Progression of Knowledge & Skills

Reception					
Area of Computing	Key Understanding and skills	Vocabulary	Implementation		Online Safety
Computer Science	To make a programmable toy or floor robot work by pressing buttons to create sounds and movements.	**Forwards** **Backwards** **Left** **Right** **Go**	Bee Bot instructions Programmable toys iPad Programming APPs		**Core Objective for Reception:** To begin to use technology safely. **Understanding and skills:** I understand and follow the schools safer internet agreement. I know to tell a trusted adult if anything on the internet upsets me. I understand to keep passwords private and not to share personal information online. **Key Vocabulary:** **Internet** **Safe** **Upset**
Information Technology	To recognise that a range of technology is used in places such as homes and schools. To know how to operate simple equipment. To use ICT hardware to interact with age-appropriate computer software.	**Computer / computing** **Lap top** **Bee Bot** **iPad** **Names of common age appropriate technology equipment**	Plugged and unplugged activities Maths/Phonics/ stories using online websites.		
Digital Literacy	To know that information can be retrieved from computers/digital devices. To complete a simple program on a computer. To select and use technology for a purpose.	**Photograph** **Camera** **Home screen** **keyboard** **Keys** **Upper/ lower case/letters** **Enter**	ICT 2 Simple pictures Use a paint program Use Word to write a name label. Take photographs on the iPad.		

Computing: Progression of Knowledge & Skills

Our youngest computer users should be able to

- Access a range of programs independently on different devices (desktops, laptops, iPads, Clevertouch)
- Create a simple program by pressing buttons to create sounds, movement, etc.
- Use a program to produce words and/or images

A safer computer user in Reception

- Knows that passwords are private and must not be shared
- Is confident to tell an adult if they see anything online that they find upsetting
- Understands there are rules that they must follow when using technology

Year 1				
Area of Computing	Key Understanding and skills	Vocabulary	Implementation	Online Safety
Computer Science	To be able to accurately provide input instructions to move a robot	**Program** **Programming** **Algorithm** **Instructions** **Turn** **Robot** **Control** **Predict** **Sprite**	Use a Beebot to explain what a given command will do. Combine forward and backward commands to make a sequence of instructions for a given goal Use Scratch to develop own algorithms that will then be combined into a program. Use this program to change the commands for a given outcome	**Core Objectives:** To use technology safely. To keep personal information private. **Year 1 understanding and skills:** I follow the schools safer internet agreement. I understand the different methods of online communication eg email.
Information Technology	To understand about technology around me including the different parts of a computer or tablet device To understand how to use technology around me safely To understand how to group data and information and how to investigate this data and information	**Keyboard** **Mouse** **Screen** **Touch** **Technology** **Search** **Select** **Website** **Pop up**	Use the school technology to log on, open a new file, type and edit words, save and then retrieve. Use and understand the online safety rules. Describe and group objects according to their properties. Look for similarities and differences between individual objects and groups of objects.	I understand that you only open an email from a known source. I understand that websites can contain pop ups. I understand that I can't always copy a picture or text from the internet. I know to tell a trusted adult if anything on the internet upsets me or if anyone tries to meet me via the internet. I use the search engines agreed by the school. I send and receive email as a class. I can use a password to access the school pupils network I understand to keep passwords private and not to share personal information online. **Key Vocabulary:** **Personal information** **Private** **Online** **Password** **Trusted Adult**
Digital Literacy	To create digital writing that has a purpose and conveys meaning To create a digital painting	**Log on/off** **Save/as** **Home Button** **Folder** **Windows** **Font** **Size** **Delete** **Shift** **Enhance** **Print**	Use the schools technology to access word processing software and write a sentence that includes capital letters, different colours and different fonts. To comment on the styles and overall effectiveness. Use Paint to create a version of a piece of artwork inspired by an artist that involves lines, shapes, different colours and shadings.	

Computing: Progression of Knowledge & Skills

Our Year 1 computer users should be able to

Computer science:
- Create a series of instructions
- Plan a journey for a programmable toy
- Use Scratch to develop algorithms and progammes

Information Technology:
- Identify common technology around them
- Log on to/off as a pupil on the school network
- Use a website
- Send and receive a class email
- Group and analyse information and data

Digital Literacy:
- Create, store and retrieve a digital image
- Create, store and retrieve digital writing

A safe computer user in Year 1

Knowledge and Understanding:
- Know that websites sometimes include pop-ups that take them away from the main site
- Begin to evaluate websites and know that everything on the internet is not true
- Know that it is not always possible to copy some text and pictures from the internet
- Know that personal information should not be shared online

Skills:
- Follow the school's safer internet rules
- Use search engines agreed by the school
- Recognise advertising on website and learn to ignore it
- Use a password to access a secure network

Year 2					
Area of Computing	**Key Understanding and skills**	**Vocabulary**	**Implementation**		**Online Safety**
Computer Science	To follow and create a set of instructions that can be programmed into a given electronic toy for a specific purpose To program animations	**Coding/ Code** **Error** **Debug** **Sequence** **Repetition** **Instructions** **Design** **Sprite** **Command**	Use an electronic toy to initially follow a set of instructions and comment on the effectiveness of the instructions. Design own algorithms and programs for different parts of the given task and investigate and debug the most efficient order. Investigate the different 'blocks' within Sprite and what changing the numbers results in. Add, combine and delete sprites that interact for an overall animation. Consider debugging codes when errors occur.		**Core Objectives:** To know where to go for help if concerned both in and out of school. **Year 2 understanding and skills:** I follow the schools safer internet agreement. I know what to do if I find something inappropriate online (eg who to go to for help, minimising screen, reporting in school, who to go to at home) I use the internet in school for learning and communicating with others and I can make choices when looking at websites. I can recognise and ignore advertising online. I can recognise the difference between email and communication systems (eg wikis). I understand that bookmarking can help me find websites quickly. I understand that not everything on the internet is true and I am beginning to evaluate websites. I understand the need to sometimes use an avatar online. I understand that my screen time should be balanced to keep me safe and healthy. **Key Vocabulary:** **Concern** **Respectful** **Acceptable** **Report** **Inappropriate**
Information Technology	To know and understand the main uses of common IT in school, at home and in some wider settings. To be able to explain how IT helps us To create pictograms and investigate the data held within them	**Uses of IT names** **Network** **Server** **Domain** **Tally** **Data** **Collect** **Pictogram** **More/Less than**	Investigate and explain the uses of IT in school and how they are the same/different from those elsewhere. Recognise that choices need to be made with IT to best support the users needs. Carry out unplugged research on a given topic that then is inputted into the computer for the computer to draw a pictogram. Use class pictograms to compare and contrast the data held within them.		
Digital Literacy	To take digital photographs and use technology to manipulate them for a desired effect To create a piece of digital music for an intended purpose	**Image** **File** **JPEG/RAW** **MP3/WMV/MP4** **Manipulate** **Tone** **Shade** **Filter** **Composition** **Texture** **Pitch** **Tempo**	Children are to take digital images, after thinking about GPDR age appropriate ideas, and comment on which are 'good' photos and which are 'bad' ones. Children are to then use various tools to manipulate the original image and explain the overall effect. Children are to initially listen to a range of music and comment on likes and dislikes. Children are to then compose a piece of music using technology and experiment with manipulating their composition.		

Computing: Progression of Knowledge & Skills

Our Year 2 computer users should be able to

Computer Science:
- Create a series of precise instructions
- Plan a journey for a programmable toy
- Write a simple program, test it and debug it

Information technology:
- Identify common uses of technology in and out of school
- Use an appropriate search engine to research a topic
- Use technology safely
- Research on a given topic and use IT to present data

Digital Literacy:
- Take and manipulate digital images
- Create digital music

A safe computer user in Year 2
Knowledge and Understanding:
- Understands the different methods of communication (eg email, online forums, etc)
- Knows you should only open email from a known source
- Knows the difference between email and communication systems eg blogs or wikis
- Begin to evaluate websites and know that everything on the internet is not true
- Know that it is not always possible to copy some text and pictures from the internet
- Know that personal information should not be shared online
- Knows that screen time should be balanced

Skills:
- Follow the school's safer internet rules
- Know what to do if they find something inappropriate online or something they are unsure of (including identifying people who can help; minimising screen; online reporting etc)both in and out of school
- Use the internet for learning and communicating with others, making choices when navigating through sites
- Send and receive email as a class

Computing: Progression of Knowledge & Skills

Year 3

Area of Computing	Key Understanding and skills	Vocabulary	Implementation		Online Safety
Computer Science	To be able to sequence sounds from given commands To understand events and actions in programs	Attributes Projects Backdrops Sequence Command Structure Event Action	Children will use Scratch to design and run a program that has multiple Sprites that have sound 'events' linked to the interactions Using Scratch or Python children will build a sequence of commands exploring block and pattern features		**Core Objectives:** To use technology safely, respectfully and responsibly To know the different ways that they can get help if concerned about anything that they experience online. **Year 3 understanding and skills:**
Information Technology	To be able to explain how digital devices function identifying input and output devices To understand how a computer network works including how they share information and the physical components of networks To know what a branching database is, how they operate and their benefits	Network Hub Web page/ browser Navigate Unique Software/ Hardware Digital Device Database Branches	Children will look at the school system and identify input and output devices before moving onto looking at other networks Unplugged and plugged activities looking into databases and selecting identification tools that are useful in databases.		I follow the schools safer internet agreement and I understand the need for these rules. I understand the need to keep personal information and passwords private. I know how to respond if asked for personal information or if I feel unsafe. I can use different search engines. I recognise that cyberbullying is unacceptable and I know how to report an incident.
Digital Literacy	To create digital media using stop-frame animation To use desktop publishing to create media	Sequence Animation Stop-frame Storyboard Media Text Graphic Font Edit Style	Children will create their own unplugged flip book before then developing this using the school technology into a stop-frame animation Children will complete a piece of learning using desktop publishing incorporating text, images, different layouts and compare the digital version to non-digital versions.		I can explain how to use email safely. I understand what copyright is. **Key Vocabulary:** **Trust** **Incident** **Respond** **Cyberbullying** **Agreement** **Copyright**

Computing: Progression of Knowledge & Skills

Our Year 3 computer users should be able to

Computer Science:
- Design a sequence of instructions including direction
- Write programs that accomplish specific goals
- Explore events, actions and sequences

Information Technology:
- Know what are common devices on a network
- Explain what a network is and how they are useful
- Design and investigate branching databases

Digital Literacy:
- Create and analyse media in digital format
- Create and analyse media in desktop publishing format

A safe computer user in Year 3
Knowledge and Understanding
- Understand the need for rules to keep them safe when exchanging learning and ideas online
- Understand that the internet contains fact, fiction and opinion and begins to distinguish between them
- Understand the need for caution when using an internet search for images and what to do if they find an unsuitable image
- Understand that copyright exists on most digital images, video and recorded music
- Understand the need to keep personal information and passwords private
- Know how to report an incident of cyber bullying
- Know the difference between online communication tools used in school and those used at home
- Understand the need to develop an alias for some public online use

Skills
- Follow the school's safer internet rules
- Explain and demonstrates how to use email safely
- Use different search engines

Year 4

Area of Computing	Key Understanding and skills	Vocabulary	Implementation	Online Safety
Computer Science	To modify repetitive code for accuracy and a given outcome To use code to edit and create own games	Error Accurate Variable Decomposition Question/Answer List Logic Reason Control Variable/s Procedure	Children will look at procedures in codes and when and how the repetition is helpful, children will compare code to daily life as a way of identifying the procedures that can then create loops. Once the procedures and loops have been identified children will explore how to edit the code for variation Children will build a program that has a specific end goal that is chosen by them and will only be met if the 'gamer' follows the code accurately	**Core Objectives**: To recognise and describe different acceptable and unacceptable behaviour when using technology **Year 4 understanding and skills:** I follow the schools safer internet agreement and I understand the need for these rules. I understand that not all information on the internet may be reliable or accurate. I can use different search engines. I know to use caution when searching for images on the internet and what to do if I find anything unsuitable. I understand that if I do make personal information available online then it can be seen by others. I know the different online communication forms that may be used at home and that outcomes to internet searches may be different at home. I understand the difference between copying the work of others and re- structuring information. I know when not to open an email or when an attachment could be unsafe. **Key Vocabulary:** **Reliable** **Accurate** **Caution** **Restructuring**
Information Technology	To understand what the Internet and WWW is, their functions, similarities and differences To use digital devices to log data	URL Research Communicate IP Address ISP Web Server Browser Author Domain Hyperlinks Refresh Wired/ Wireless Sensor Data Record	Children are to investigate the Internet and WWW for their functions and origins. Children will further develop their online safety knowledge with a particular focus on age ratings and social media platforms. Children are to use data loggers to collect information on a given topic, eg light, temperature throughout the day, and then use digital tools to investigate and present this data	
Digital Literacy	To create, combine and edit audio files To take, edit, manipulate and combine photo files	Audio Select Enhance Pitch Tone Extract Crop	Children are to listen to a variety of podcast extracts and analyse for their engagement. Children are to investigate how to combine and edit audio files for a specific intention and arrange multiple sound files for their own project. Children are to design their own leaflet using photo editing and text editing skills	

Computing: Progression of Knowledge & Skills

Our Year 4 computer users should be able to

Computer Science:
- Check code for errors and edit for their own outcome
- Comment on code in everyday life
- Use loops and edits to create own code based games

Information Technology:
- Use data logging equipment to collect data
- Analyse data that they have collected
- Be knowledgeable in what the Internet and WWW is
- Discuss the need for age appropriate use of social media apps

Digital Literacy:
- Create own audio files
- Take, edit and combine digital images

A safe computer user in Year 4

Knowledge and Understanding:
- Recognise that information on the internet may not be accurate or reliable and may be used for bias, manipulation or persuasion
- Know how to respond if asked for personal information or feels unsafe about content of a message
- Recognise that cyber bullying is unacceptable and will be sanctioned in line with the school's policy
- Understand that the outcome of internet searches at home may be different than at school
- Understand that if they make personal information available online it may be seen and used by others

Skills:
- Recognise the difference between the work of others which has been copied (plagiarism) and re-structuring and re-presenting materials in ways which are unique and new
- Identify when emails should not be opened and when an attachment may not be safe

Computing: Progression of Knowledge & Skills

Year 5

Area of Computing	Key Understanding and skills	Vocabulary	Implementation		Online Safety
Computer Science	To design, write, and debug programs that accomplish specific goals 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	**Physical system** **Decomposition** **Protocol** **Condition** **Algorithm** **Infinite loop**	Explore how the flow of conditions, actions and statements in algorithms results in intended outcomes both physically and electronically Investigate and understand how when answers similar to those in the condition are given as inputs this can result in errors and how to debug accordingly. Use 'set up' protocols to allow all users to have similar experiences.		<u>Core Objectives</u>: To understand the need to make choices when using technology and to understand that not everything is safe. <u>Year 5 understanding and skills</u>: I follow the schools safer internet agreement, understand the need for these rules and make safe choices. I know what to do if I discover/ receive something inappropriate/ malicious. I understand what a digital footprint is and know that anything that I put online can be difficult to remove. I can make and manage strong passwords. I understand the risks involved with putting personal information online. I know not to meet someone that I have only met online. I understand that some websites/ pop ups can be for commercial gain. I understand that some online material is copyrighted and I reference sources. I confidently and competently use the internet as a search tool. **Key Vocabulary:** **Malicious** **Remove** **Secure** **Online material** **Reference**
Information Technology	To understand computer networks, including the internet and databases Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content	**Intranet** **LAN (local area network)** **WAN (wider area network)** **Server** **Relevance** **Fact/opinion** **Authenticity** **Reliability**	Use topic based plugged and unplugged activities to support learning. Explore in more detail how networks work to efficiently solve problems such as comparing and sorting data. Think about observing or exploring sorting algorithms before moving onto simulating this kind of process. Investigate databases and their functions – including how to search, edit and add information to databases. Explore the importance of data accuracy and concept of GPDR		
Digital Literacy	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	**Visual media** **Digital content** **Manipulate** **Resize**	Explore how to use capture, manipulate, store and share digital images and video content Investigate how digital images can be layered to provide certain effects and produce own vector diagrams to demonstrate the effectiveness of layering digital content		

Computing: Progression of Knowledge & Skills

Our Year 5 computer users should be able to

Computer science:
Understand flow of actions in algorithms
- Use technology to control an external device
- Design algorithms that use repetition & infinite loops
- Use 'set up' protocols

Information Technology
- Analyse & evaluate information
- Explore networks in more detail including efficiency

Digital Literacy
- Understand that you have to make choices when using technology and that not everything will work or is appropriate
- Plan, create and evaluate digital art work
- Edit a film and add audio to enhance work

A safe computer user in Year 5
Knowledge and Understanding
- Discuss the positive and negative impact of the use of ICT in own life, with friends and family
- Understand the potential risk of providing personal information online
- Recognise why people may publish content that is not accurate
- Understand that some of the material on the internet is copyrighted and may not be copied or downloaded
- Understand that some messages may be malicious and know how to deal with this
- Understand that online environments have security settings, which can be altered, to protect the user
- Know how to report any suspicions in school, at home and in the wider community.

Skills
- Make safe choices about the use of technology
- Create strong passwords and manage them so that they remain strong
- Competently use the internet as a search tool
- Reference information sources

Year 6

Area of Computing	Key Understanding and skills	Vocabulary	Implementation	Online Safety
Computer Science	To design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts To use sequence, selection, and repetition in programs; work with variables and various forms of input and output To use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	**Variable** **Layer** **Interconnecting** **Construct** **Step counter** **External input**	Design and make their own 'real life' variable project including layers of variables Apply knowledge of programming constructs and use their own programme design to create a micro:bit-based step counter	**Core Objectives:** To be increasingly aware of the potential dangers in using aspects of ICT and to know when to alert someone If they feel uncomfortable and who to go to in school, at home and in the community(eg reporting to websites, police). **Year 6 understanding and skills:** I am able to discuss the positive and negative aspects of ICT in my life and that of my family and friends. I understand the need to be a critical analyser of content and that content can be inaccurate. I understand the risks of using the internet (eg scams, phishing). I understand about security settings and how they can protect the user. I understand that I shouldn't put other people's information/ photos etc on the internet without asking them. I understand the use of different domain names (eg .net, .gov etc) and can use these to support validation of information. **Key Vocabulary:** **Critical** **Validate** **Security Settings** **Analyse** **Scam** **Phishing**
Information Literacy	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. To understand computer networks, including the internet and databases	**Public** **Private** **Collaborative** **online project** **Spreadsheet** **Application**	Explore different methods of Internet based communication and understand that a choice is needed for the best format of communication Explore how databases and spreadsheet applications can be used to analyse and present data	
Digital Literacy	To u se search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content To select, use, and combine a variety of software (including internet services) on a range of digital devices	**Content** **User** **External** **Navigation** **Modelling** **Manipulation**	Design, create and evaluate their own webpages considering content, navigation and external links Create a computer generated 3D model of a building	

Computing: Progression of Knowledge & Skills

Our Year 6 computer users should be able to

Computer Science:
- Design a solution by breaking a problem up
- Recognise that different solutions can exist for the same problem
- Use logical reasoning to detect errors in algorithms
- Use layers of variables in programs
- Use external devices for code input

Information Technology:
- Use technology to accurately communicate
- Use databases and spreadsheets to interrogate And present data

Digital Literacy:
- Select, use and combine software on a range of digital devices
- Present information in a variety of ways
- Make discerning choices about digital content and evaluate results

A safe computer user in Year 6

Knowledge and Understanding:
- Understand the need to be critical evaluators of content
- Understand that some websites and/or pop-ups have commercial interests that may affect the way Information is presented
- Recognise the potential risks of using internet communication tools and understand how to minimise risks
- Understand that some malicious adults may use various techniques to make contact and elicit personal information
- Know that it is unsafe to arrange to meet unknown people on line
- Understand they should not publish other people's pictures or tag them on the internet without permission
- Know that content put online is extremely difficult to remove (digital footprint).

Skills:
- Independently select and use appropriate communication tools to solve problems by collaborating and communicating with others within and beyond school
- Use appropriate strategies for finding, critically evaluation, validating and verifying information eg using different key words, skim reading to check relevance, cross checking,
- Use knowledge of the meaning of different domain names and common website extensions eg .co.uk, .com, .sch, . org etc.

Computing: Progression of Knowledge & Skills

Whole School Computing Overview

		Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computer Science	**Algorithms**	x	x	x	x	x	x	x
	Computer Systems	x	x	x	x	x	x	x
	Programming	x	x	x	x	x	x	x
Information Technology	**Networks**			x	x	x	x	x
	Data and Information	x	x	x	x	x	x	x
Digital Literacy	**Creating Media**	x	x	x	x	x	x	x
	Design and development	x	x	x	x	x	x	x
	Effective use of tools	x	x	x	x	x	x	x

Computing: Progression of Knowledge & Skills