

Brindley Heath Academy Computing Policy

Contents

1. Curriculum INTENT	
Aims and Values	1
2. Curriculum IMPLEMENTATION	2
1. Curriculum Design	Error! Bookmark not defined.
2. E-Safety	5
3. Teaching and Learning and Assessment	6
The Computing and E-Safety Coordinator	8
3. Curriculum IMPACT	8

1. Curriculum INTENT

"A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world." (Computing Programme of Study 2014)

Computing and ICT (Information and Communications Technology) play a vital role in our lives, particularly in current times where technologies are constantly changing and evolving. A sound knowledge and understanding of ICT and Computing enables and prepares pupils to be active participants in a world where work, and other activities, are increasingly transformed by access to varied and developing technology. It is our duty as educators to ensure all children have access to an education in which such technologies are available and skills taught and practiced to a high standard in a variety of ways, as part of our vision to "build wisely for life". The new curriculum (implemented in 2014) reflected the developments that have taken place over recent years; shifting focus from children learning how to use computers, to becoming competent and confident analytical thinkers, computer programmers and understanding how technology works.

Aims and Values

We aim for our curriculum to:

- Provide a whole school approach to Computing, ensuring continuity and progression and that children are given the opportunity to develop their capabilities in all areas of the National Curriculum Programme of Study.
- Provide challenge and excitement for our pupils, both in Computing lessons and through the use of technology across the curriculum.
- Enable our children to be confident and independent users of technologies and be able to experiment with them in different ways to communicate learning.
- Ensure our children are responsible and respectful users of information and communication technology.

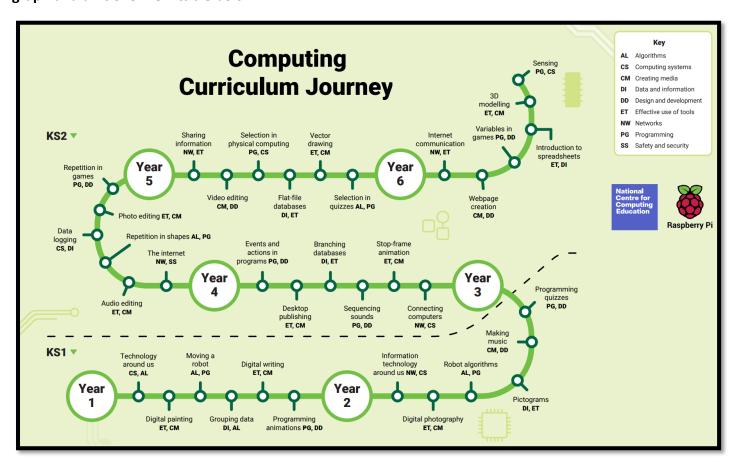
2. Curriculum IMPLEMENTATION

Curriculum Design

At Brindley, we follow the Teach Computing curriculum developed by the National Centre for Computing Education. The curriculum provides an innovative progression framework where computing contents (concepts, knowledge, skills and objectives) are organised into interconnect networks.

- The curriculum is broken into the following strands:
 - o AL Algorithms Be able to comprehend, design, create, and evaluate algorithms
 - CS Computing Systems Understand how networks can be used to retrieve and share information, and how they come with associated risks
 - CM Creating Media Select and create a range of media including text, images, sounds, and video
 - DI Data and Information Understand how data is stored, organised, and used to represent real-world artefacts and scenarios
 - DD Design and Development Understand the activities involved in planning, creating, and evaluating computing artefacts
 - o ET Effective Use of Tools Use software tools to support computing work
 - NW Networks Understand how individuals, systems, and society as a whole interact with computer systems
 - o PG Programming Create software to allow computers to solve problems
 - SS Safety and Security Understand risks when using technology, and how to protect individuals and systems

Whilst all strands are present at all phases, they are not always taught explicitly. See **learning progression** graph and unit overview table below.



	Aut 1	Aut 2	Spr 1	Spr 2	Sum 1	Sum 2
	Computing Systems and Networks - Connecting	Creating Media - Animation During this unit, learners will use a	Creating Media - Desktop Publishing	Data and Information - Branching Databases	Programming A - Sequence in Music	Programming B - Events and Actions
Year 3	Computers Challenge your learners to develop their understanding of digital devices, with an initial focus on inputs, processes, and outputs. Start by comparing digital and non-digital devices, before introducing them to computer networks that include network infrastructure devices like routers and switches.	ouning this utili, Reamers will use a range of techniques to create a stop frame animation using tablets. Next, they will apply those skills to create a story-based animation. This unit will conclude with learners adding other types of media to their animation, such as music and text.	During this unit, learners will become familiar with the terms 'tex' and 'images' and understand that they can be used to communicate messages. They will use desktop publishing software and consider careful choices of font size, colour and type to edit and improve premade documents. Learners will be introduced to the terms 'templates', 'orientation', and 'placeholders' and begin to understand how these can support them in making their own template for a magazine front cover. They will start to add text and images to create their own pieces of work using desktop publishing software. Learners will look at a range of page layouts thinking carefully about the purpose of these and evaluate how and why desktop publishing is used in the real world.	During this unit, learners will develop their understanding of what a branching database is and how to create one. They will gain an understanding of what attributes are and how to use them to sort groups of objects by using yes/no questions. The learners will create physical and on-screen branching databases. Finally, they will evaluate the effectiveness of branching databases and will decide what types of data should be presented as a branching database.	This unit explores the concept of sequencing in programming through Scratch. It begins with an introduction to the programming environment, which will be new to most learners. They will be introduced to a selection of motion, sound, and event blocks which they will use to create their own programs, featuring sequences. The final project is to make a representation of a plano. The unit is paced to focus on all aspects of sequences, and make sure that knowledge is built in a structured manner. Learners also apply stages of program design through this unit.	This unit explores the links between events and actions, whilst consolidating prior learning relating to sequencing. Learners will begin by moving a sprite in four directions (up, down, left and right). They will then explore movement within the context of a maze, using design to choose an appropriately sized sprite. This unit also introduces programming extensions, through the use of pen blocks. Learners are given the opportunity to draw lines with sprites and change the size and colour of lines. The unit concludes with learners designing and coding their own maze tracing program.
	Computing Systems and Networks - The Internet	Creating Media - Audio Editing	Creating Media - Photo Editing	Data and Information - Data Logging	Programming A - Repetition in Shapes	Programming B - Repetition in Games
Year 4	During this unit learners will apply their knowledge and understanding of networks, to appreciate the internet as a network of networks which need to be kept secure. They will learn that the World Wide Web is part of the internet, and be given opportunities to explore the World Wide Web for themselves to learn about who owns content and what they can access, add, and create. Finally they will evaluate online content to decide how honest, accurate, or reliable it is, and understand the consequences of false information.	In this unit, learners will initially examine devices capable of recording digital audio, which will include identifying the input device (microphone) and output devices (speaker or headphones) if available. Learners will discuss the ownership of digital audio and the copyright implications of duplicating the work of others. In order to record audio themselves, learners will use Audacity to produce a podeast, which will include editing their work, adding multiple tracks, and opening and saving the audio files. Finally, learners will evaluate their work and give feedback to their peers.	In this unit, learners will develop their understanding of how digital images can be changed and edited, and how they can then be resawed and reused. They will consider the impact that editing images can have, and evaluate the effectiveness of their choices.	In this unit, pupils will consider how and why data is collected over time. Pupils will consider the senses that humans use to experience the environment and how computers can use special input devices called sensors to monitor the environment. Pupils will collect data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals. Pupils will spend time using a computer to review and analyse data. Towards the end of the unit, pupils will pose questions and then use data loggers to automatically collect the data needed to answer those questions.	This unit is the first of the two programming units in Year 4, and looks at repetition and loops within programming. Pupils will create programs by planning, modifying, and testing commands to create shapes and patterns. They will use Logo, a text-based programming language.	This unit explores the concept of repetition in programming using the Scratch environment. It begins with a Scratch activity similar to that carried out in Logo in Programming unit A, where learners can discover similarities between two environments. Learners look at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. Their final project is to design and create a game which uses repetition, applying stages of programming design throughout.
	Computing Systems and Networks - Sharing Information	Creating Media - Vector Drawing	Creating Media - Video Editing	Data and Information - Flat- File Databases	Programming A - Selection in Physical Computing	Programming B - Selection in Quizzes
Year 5	In this unit, learners will develop their understanding of computer systems and how information is transferred between systems and devices. Learners will consider small-scale systems as well as large-scale systems. They will explain the input, output, and process aspects of a variety of different real-world systems. Learners will also take part in a collaborative online project with other class members and develop their skills in working together online.	In this unit learners will find out that vector images are made up of shapes. They will learn how to use the different drawing tools and how images are created in layers. They will explore the ways in which images can be grouped and duplicated to support them in creating more complex pieces of work. This unit is planned using the Google Drawings app other alternative pieces of software are available.	This unit gives learners the opportunity to learn how to create short videos in groups. As they progress through this unit, they will be exposed to topic-based language and develop the skills of capturing, editing, and manipulating video. Active learning is encouraged through guided questions and by working in small groups to investigate the use of devices and software. Learners are guided with step-by-step support to take their idea from conception to completion. At the teacher's discretion, the use of green screen can be incorporated into this unit. At the conclusion of the unit, learners have the opportunity to reflect on and assess their progress in creating a video.	This unit looks at how a flat-file database can be used to organise data in records. Pupils use tools within a database to order and answer questions about data. They create graphs and charts from their data to help solve problems. They use a real-life database to answer a question, and present their work to others.	In this unit, learners will use physical computing to explore the concept of selection in programming through the use of the Crumble programming environment. Learners will be introduced to a microcontroller (Crumble controller) and learn how to connect and program components (including output devices. LEDs and motors) through the approach of the creating proposed to th	In this unit, pupils develop their knowledge of selection by revisiting how conditions can be used in programs and then learning how the Ir. Then Else structure can be used to select different outcomes depending on whether a condition is true or false. They represent this understanding in algorithms and then by constructing programs using the Scratch programming environment. They learn how to write programs that ask questions and use selection to control the outcomes based on the answer given. They use this knowledge to design a quiz in response to a given task and implement it as a program. To conclude the unit, learners evaluate their program by identifying, how it meets the requirements of the task; the ways they have improved it, turther ways it could be imed dipoyed.
	Computing Systems and Networks - The Internet	Creating Media - 3D Modelling	Creating Media - Web-page Creation	Data and Information - Spreadsheets	Programming A - Variables in Games	Programming B - Sensing This unit is the final KS2 programming
Year 6	During this unit learners will apply their knowledge and understanding of networks, to appreciate the internet as a network of networks which need to be kept secure. They will learn that the World Wide Web is part of the internet, and be given opportunities to explore the World Wide Web for themselves to learn about who owns content and what they can access, add, and create. Finally they will evaluate online content to decide how honest, accurate, or reliable it is, and understand the consequences of false information.	During this unit, learners will develop their knowledge and understanding of using a computer to produce 3D models. Learners will initially familiarise themselves with working in a 3D space, including combining 3D objects to make a house and examining the differences between working digitally with 2D and 3D graphics. Learners will progress to making accurate 3D models of physical objects, such as a pencil holder, which include using 3D objects as placeholders. Finally, learners will examine the need to group 3D objects, then go on to plan, develop, and evaluate their own 3D model of a photo frame.	This unit introduces learners to the creation of websites for a chosen purpose. Learners identify what makes a good web page and use this information to design and evaluate their own website using Google Sites. Throughout the process learners pay specific attention to copyright and fair use of media, the aesthetics of the site, and navigation paths.	This unit introduces the learners to spreadsheets. Learners are supported in organising data into columns and rows to create their own data set. They are taught the importance of formatting data to support calculations. Learners are introduced to formulas and begin to understand how these can be used to produce calculated data. They are taught how to apply formulas which include a range of cells and apply formulas to multiple cells by duplicating them. Learners use spreadsheets to plan an event and answer questions. Finally learners create graphs and charts and evaluate their results in comparison to questions asked.	This unit explores the concept of variables in programming through games in Scratch. First, pupils will learn what variables are, and relate them to real-world examples of values that can be set and changed. Pupils will then use variables to create a simulation of a scoreboard. In Lessons 2, 3, and 5, which follow the Use-Modify-Create model, pupils will experiment with variables in an existing project, then modify them, then they will create their own project. In Lesson 4, pupils will focus on design. Finally, in Lesson 6, pupils will apply their knowledge of variables and design to improve their game in Scratch.	unit and brings together elements of all the four programming constructs: sequence from year 3, repetition from year 4, selection from year 5 and variables, introduced in year 6, programming A It offers learners the opportunity to use all off these constructs in a different, but still familiar environment whilst also utilising a physical device - the microcky. The unit begins with a simple program which learners build in and test in the programming environment before transferring it to their microcky! Learners then take on three new projects in lessons 2, 3 and 4, with each lesson adding more depth. Design feature prominently in this unit. A design in lesson 4 and

Spiral curriculum

The units for Key Stage 2 are based on a spiral curriculum. This means that each of the themes is revisited regularly (at least once in each year group), and pupils revisit each theme through a new unit that consolidates and builds on prior learning within that theme. This style of curriculum design reduces the amount of knowledge lost through forgetting, as topics are revisited yearly. It also ensures that connections are made even if different teachers are teaching the units within a theme in consecutive years.

Physical computing

The Teach Computing Curriculum acknowledges that physical computing plays an important role in modern pedagogical approaches in computing, both as a tool to engage pupils and as a strategy to develop pupils' understanding in more creative ways. Additionally, physical computing supports and engages a diverse range of pupils in tangible and challenging tasks. The physical computing units in the Teach Computing Curriculum are in Year 5 (Selection using a Crumble Controller) and in Year 6 (Sensing using a micro:bit)

Inclusive and Ambitious

The Teach Computing Curriculum has been written to support all pupils. Each lesson is sequenced so that it builds on the learning from the previous lesson, and where appropriate, activities are scaffolded so that all pupils can succeed and thrive. Scaffolded activities provide pupils with extra resources, such as visual prompts, to reach the same learning goals as the rest of the class. Exploratory tasks foster a deeper understanding of a concept, encouraging pupils to apply their learning in different contexts and make connections with other learning experiences. As well as scaffolded activities, embedded within the lessons are a range of pedagogical strategies (defined in the 'Pedagogy' section of this document), which support making computing topics more accessible.

National Curriculum Coverage

National Curriculum Coverage — Years 3 and 4	3.1 Connecting computers	3.2 Stop-frame animation	3.3 Sequencing sounds	3.4 Branching databases	3.5 Desktop publishing	3.6 Events and actions in programs	4.1 The Internet	4.2 Audio editing	4.3 Repetition in shapes	4.4 Data logging	4.5 Photo editing	4.6 Repetition in games
Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts			1			1			1			1
Use sequence, selection, and repetition in programs; work with variables and various forms of input and output	1		1			/			1	1		1
Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs			1			/			1			1
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	1						1					
Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content					/		1	/			1	
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	1	✓	1	✓	√	1	1	1	1	1	1	1
Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact							1	1			/	
National Curriculum Coverage — Years 5 and 6	5.1 Sharing information	5.2 Video editimg	5.3 Selection in physical computing	5.4 Flat-file databases	5.5 Vector drawing	5.6 Selection in quizzes	6.1 Internet communication	6.2 Webpage creation	6.3 Variables in games	6.4 Introduction to spreadsheets	6.5 3D modelling	6.6 Sensing
Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts	1		/			/	1		1			1
Use sequence, selection, and repetition in programs; work with variables and various forms of input and output	1		1			1			1			/
Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs			1			1			1			1
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	1						1					
Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content		1		/			1	/				
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	1	1	1	✓	/	/	1	/	1	1	1	1
Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable	/	/						/	/		/	

E-Safety

Computing ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

In Key Stage 2 pupils should be taught to:

- Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.
- Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

At Brindley, we recognise that children and young today are using the immense power of digital media to explore, connect, create, and learn in ways never before imagined. With this power, young people have extraordinary opportunities, and yet they face many potential pitfalls. Meanwhile, schools are dealing with the associated ramifications – for example, cyberbullying, digital cheating, desensitisation and the lack of understanding of permanency and replication. These safety and security concerns underscore the need for children and young people to learn — and for teachers to teach — digital literacy and citizenship skills and for schools to support their pupils to act responsibly and to use the internet in a better way. As such, in addition to our Computing curriculum, our children receive a complete eSafety curriculum adapted from the SWGfL schemes of learning.

Each year group receives five online safety lessons each year that are drip-fed at timely intervals across the academic year. These lessons offer a range of comprehensive approaches to addressing safety and security concerns, including ethic and behaviour issues, including topics such as private information, online communication, cyberbullying and online identity. These lessons are recorded in the year group Computing books (see below)

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5
Year 3	Passwords	Online Community Communication Online	Communication Online	Showing Respect Online	E-mail Communication
Year 4	Online identity Communication Online	Being a digital citizen online Communication Online	Cyberbullying	Keywords	Digital Citizens
Year 5	Strong Passwords	Social Media Communication Online	Online Presence Communication Online	Online Time/Gaming Communication Online	Online Community/Digital Citizens Communication Online
Year 6	Talking Safely Online Communication Online	Privacy Rules/Social Media Communication Online	Online Time/Gaming Communication Online	Cyberbullying	Stereotypes

Any eSafety issues that arise throughout a year are reported by staff via the school CPOMS system and reviewed by the DSL and Computing and eSafety coordinator on a regular basis.

Teaching and Learning and Assessment

Whilst opportunities to embed the use of technology to support learning across the curriculum in a cross-curricular nature are expected, the teaching of specific Computing and eSafety lessons is discrete with each class allocated a 1 hour slot in the school computing suite each week.

All planning is <u>available online</u> and should be adapted according to the specific needs of the children within a class. Planning must be centred around the needs of the pupils and designed to meet a range of differing needs, including those needing additional support. Learning needs for all pupils are met using the whole school approach of Support, Scaffold, Standard and Stretch - see wider teaching and learning policy.

Each year group has a Computing Book in which lessons are recorded, including the specific lesson I can, Success Criteria and 'Stretch' activity (in line with the school's wider approach to differentiation, stretch and challenge). See example below. Teachers' assess pupil learning with a lesson according to whether they met the I can in question and to what level, Support, Scaffold, Standard, Stretch (in line with the school's wider assessment system). Teacher's highlight green, orange or pink accordingly.

	Brindley Heath Computing Curriculum	
Year Group:		
Computing Unit:		
Lesson Number:		
I can:		
Keys to Success:	•	
	•	
	•	
Stretch:		

Class 4ES	Assessment	Class 4D	Assessment
1	S S S S	1	S & & &
2	S & & &	2	S & & &
3	S & & &	3	S & & &
4	S & & &	4	S & & &
5	S & & &	5	S & & &
6	S & & &	6	S & & &
7	S & & &	7	S & & &
8	S & & &	8	S & & &
9	S & & &	9	S & & &
10	S & & &	10	S & & &
11	S & & &	11	S & & &
12	S & & &	12	S & & &
13	S & & &	13	S & & &
14	S & & &	14	S & & &
15	S & & &	15	S & & &
16	S & & &	16	S & & &
17	S & & &	17	S & & &
18	S & & &	18	S & & &
19	S & & &	19	S & & &
20	S & & &	20	S & & &
21	S & & &	21	S & & &
22	S & & &	22	S & & &
23	S & & &	23	S & & &
24	S & & &	24	S & & &
25	S & & &	25	S & & &
26	S & & &	26	S & & &
27	S & & &	27	S & & &
28	S & & &	28	S & & &
29	S & & &	29	S & & &
30	S & & &	30	S & & &
31	S & & &	31	S & & &
32	S & & &	32	S & & &

Effective Pedagogy

Effective pedagogy is at the heart of good teaching and learning; successful computing teachers combine their knowledge of the subject with evidence-based teaching practices. As computing is a relatively new discipline, evidence of effective teaching approaches continues to emerge and evolve. The work of the NCCE is underpinned by 12 principles of Computing Pedagogy.

Lead with concepts

Support pupils in the acquisition of knowledge, through the use of key concepts, terms, and vocabulary, providing opportunities to build a shared and consistent understanding. Glossaries, concept maps, and displays, along with regular recall and revision, can support this approach.

• Unplug, unpack, repack

Teach new concepts by first unpacking complex terms and ideas, exploring these ideas in unplugged and familiar contexts, then repacking this new understanding into the original concept. This approach (semantic waves) can help pupils develop a secure understanding of complex concepts.

Create projects

Use project-based learning activities to provide pupils with the opportunity to apply and consolidate their knowledge and understanding. Design is an important, often overlooked aspect of computing. Pupils can consider how to develop an artefact for a particular user or function, and evaluate it against a set of criteria.

• Challenge misconceptions

Use formative questioning to uncover misconceptions and adapt teaching to address them as they occur. Awareness of common misconceptions alongside discussion, concept mapping, peer instruction, or simple quizzes can help identify areas of confusion

Structure lessons

Use supportive frameworks when planning lessons, such as PRIMM (Predict, Run, Investigate, Modify, Make) and Use-Modify-Create. These frameworks are based on research and ensure that differentiation can be built in at various stages of the lesson

• Work together

Encourage collaboration, specifically using pair programming and peer instruction, and also structured group tasks. Working together stimulates classroom dialogue, articulation of concepts, and development of shared understanding.

Model everything

Model processes or practices — everything from debugging code to binary number conversions — using techniques such as worked examples and live coding. Modelling is particularly beneficial to novices, providing scaffolding that can be gradually taken away.

Add variety

Provide activities with different levels of direction, scaffolding, and support that promote active learning, ranging from highly structured to more exploratory tasks. Adapting your instruction to suit different objectives will help keep all pupils engaged and encourage greater independence,

Make concrete

Bring abstract concepts to life with realworld, contextual examples and a focus on interdependencies with other curriculum subjects. This can be achieved through the use of unplugged activities, proposing analogies, storytelling around concepts, and finding examples of the concepts in pupils' lives

• Read and explore code first

When teaching programming, focus first on code 'reading' activities, before code writing. With both block-based and text-based programming, encourage pupils to review and interpret blocks of code. Research has shown that being able to read, trace, and explain code augments pupils' ability to write code.

Get hands-on

Use physical computing and making activities that offer tactile and sensory experiences to enhance learning. Combining electronics and programming with arts and crafts (especially through

exploratory projects) provides pupils with a creative, engaging context to explore and apply computing concepts.

• Foster program comprehension

Use a variety of activities to consolidate knowledge and understanding of the function and structure of programs, including debugging, tracing, and Parson's Problems. Regular comprehension activities will help secure understanding and build connections with new knowledge.

The Computing and eSafety Coordinator

The school has a designated Computing Leader to oversee the planning, teaching and organisation of Computing and eSafety. The Coordinator will be responsible for:

- Raising standards in Computing across school by:
 - Supporting others in planning, teaching and assessment;
 - Facilitating the use of ICT across the curriculum, in collaboration with other subject coordinators;
 - Ensuring staff are up to date with training to enable them to deliver the curriculum confidently and effectively.
 - Providing advice to staff in terms of resourcing, planning, using software and equipment, effective resources
 - Keeping up to date with recent developments in Computing

3. Curriculum IMPACT

- When children leave us in Year 6, they should be highly proficient in using technology and can develop their computing skills in their further education.
- Children should be excited about their computing experiences and enthusiastic about developing these further into Key Stage 3 and beyond.
- Children will have a sound foundation to confidently and safely communicate, evaluate and use a variety of formats in the technological world we live in.