Computing Policy

William Reynolds Primary School and Nursery

Approved by Governors June 2016

To be reviewed June 2018

These polices are referred to in the document

Whole School Vision Statement

E-Awareness Policy

Social Network Policy

Code of Conduct

ICT Acceptable use policy

Curriculum Maps

Interactive assessment grid for computing

Aim

The use of technology is an integral part of our curriculum and provides pupils with the technological skills they will need to live in our modern world. At William Reynolds Primary School we use computing skills across all curriculum areas. This involves using the internet to look at sources of information. This is done in as safe a way as possible, using search engines that are appropriate for children and under adult supervision. Part of our Computing curriculum is E-awareness and this provides pupils with the knowledge of how to keep safe when using the internet.

Our Computing Policy combines Computer Science and Information Technology allowing pupils to become digitally literate. We recognise the value of using technology to enhance the curriculum but also realise that pupils need to have a sound awareness of how to keep safe.

Vision

"We believe that we make a difference by **creating a safe, healthy and stimulating environment** of **quality provision** where our children feel and know how to keep themselves safe, happy and supported in their learning in school and in the wider community." **(Whole School Vision Statement)**

To develop lifelong transferable skills through promoting curiosity, confidence and creativity whilst inspiring challenge.

Computing at William Reynolds Primary School
Foundation Stage

At William Reynolds Primary School, the Foundation Stage pupils investigate technology as part of Understanding of the World. Through exploratory play, children use technological toys and learn that they can make them work by pressing buttons and clicking on icons. They are taught how to complete simple programs which they use to support their phonics and mathematical skills. Through role play, discussion and stories children learn that technology can be used for a range of purposes cross home and school. Technology is used in the Foundation Stage, by adults and pupils to capture ideas, thoughts and experiences through images and text. This is a fundamental part of the evidencing process which tracks the learning journey.

Key Stage 1 and 2

Teachers use the Computing Scheme of work to plan units across a term. Learning objectives are linked to the program of study and key skills are identified to ensure pupils make progress across each key stage.

Across a year, teachers plan two units of Computer Science and a block of Digital Literacy. As Digital Literacy has a strong e-awareness element, an initial lesson is also taught at the beginning of every half term to remind pupils of expectations for safety. Information and Technology is taught across curriculum subjects with an additional block to enable classes to focus on a project for example; animation or blogging. This strand coverage is full explained in the scheme of work.

Pupils and parents read, agree and sign an **E-awareness Policy** to say that they understand and comply with our agreed school rules on how to be safe. The 'Think then Click' agreement is then returned to school and kept as a log for permission.

All staff read and sign the **Social Networking Policy** and agree that they understand and comply with our agreed school rules on using social networking sites and technology on school premises. This is also outlined in the **Staff Code of Conduct and ICT Acceptable use Policy.**
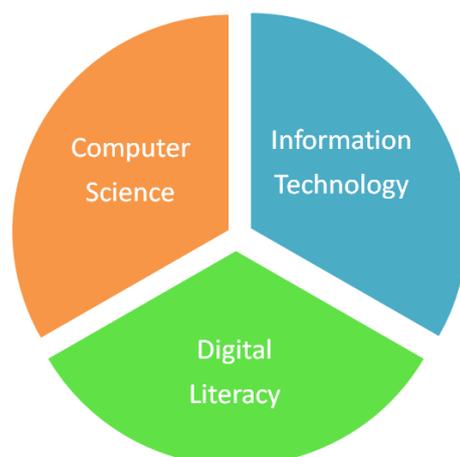
Computing Scheme of Work

What is Computing?

Computing replaces the previously named ICT. This is a move away from learning how to use technology and towards learning about computers and computation. Computing is the understanding of how computer systems work, and how they are designed and programmed. This may or may not include computers as 'computational thinking provides insights into many areas of the curriculum, and influences work at the cutting edge of a wide range of disciplines.' (Naace, "Computing in the National Curriculum")
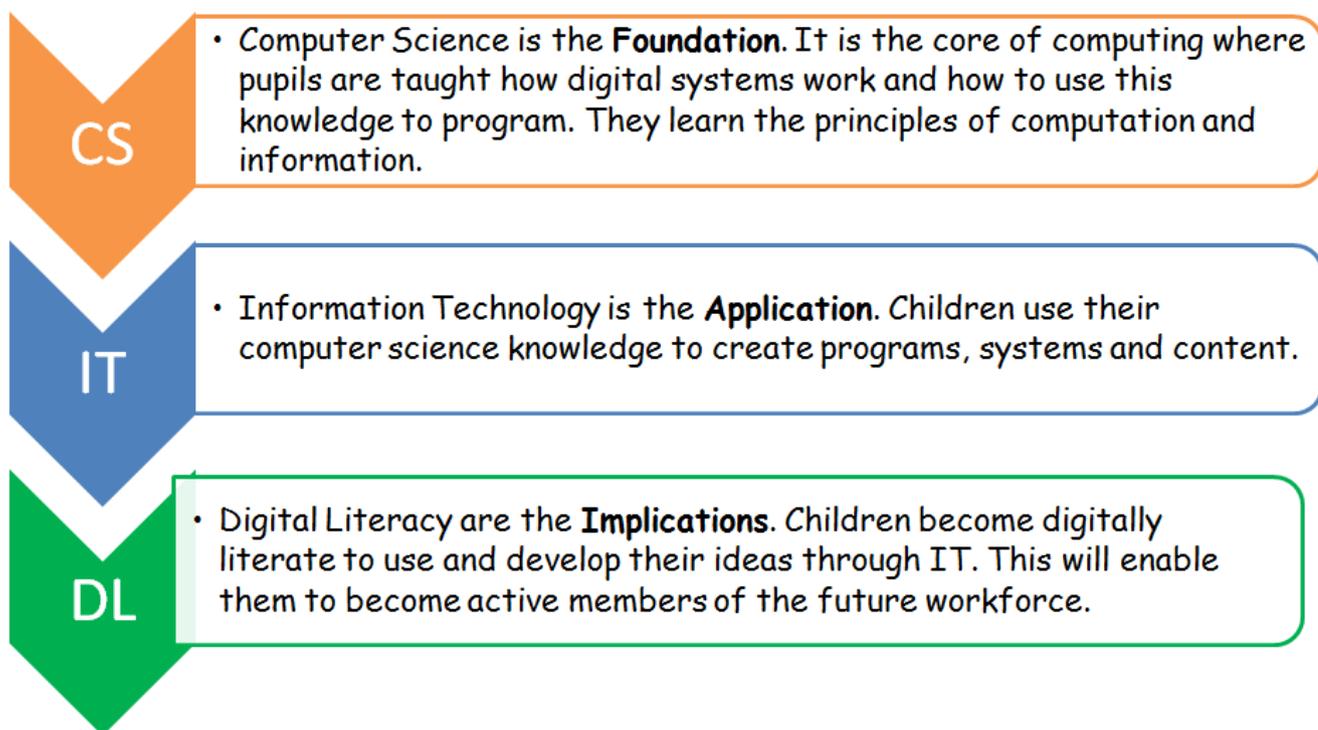
At William Reynolds Primary School and Nursery we believe that computational thinking develops important key skills including problem solving, designing, collaboration, creativity and resourcefulness these marry with our Secrets of Success ethos successfully.

The Computing   curriculum is made up of
three main   strands.

These strands are linked together.

CS
- Computer Science is the **Foundation**. It is the core of computing where pupils are taught how digital systems work and how to use this knowledge to program. They learn the principles of computation and information.

IT
- Information Technology is the **Application**. Children use their computer science knowledge to create programs, systems and content.

DL
- Digital Literacy are the **Implications**. Children become digitally literate to use and develop their ideas through IT. This will enable them to become active members of the future workforce.

All of these three strands are of equal importance.

Computer Science

Pupils are taught the principles of

- how computer systems work

- finding and fixing mistakes in a program (*Debugging*)
- using logical thinking to solve problems
- sequencing instructions (*Algorithms*) to make something happen (*Programming*)

Information Technology

Pupils then have the knowledge to use IT to

- create programs
- create content
- store and manipulate content
- retrieve digital content

Digital Literacy

Pupils then become digitally literate so that they are

- prepared for the future workplace
- responsible and safe users
- competent, confident and evaluative

Subject Knowledge for the Key Stage 1 Curriculum
(Taken from Computing in the national curriculum. A guide for Primary Teachers 2013)

Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
An algorithm is a precisely defined procedure –a sequence of instructions, or a set of rules, for performing a specific task (e.g. instructions for changing a wheel or making a sandwich). While all correct algorithms should produce the

right answer, some algorithms are more efficient than others. Computer scientists are interested in finding better algorithms, partly out of intellectual curiosity, and partly because improvements in algorithms can result in massive savings in terms of both cost and time.

Computer programs, like algorithms, are comprised of sets of rules or instructions, but they differ in that they need to be written in a precise language a computer can 'understand'. A computer's central processor understands a very limited set of simple instructions written in machine code. Very few programmers work at this level, so computer scientists have developed programming languages, which sit somewhere between the ideas in the algorithm and the computer's machine code.

A programmer can turn an algorithm into code using a programming language that has enough in common with the English language to make it easy to read, remember and write. The programming language takes care of the minute details, like how to do multiplication or where data should be stored in the computer's memory, which means the programmer can focus on the big picture. There are many different programming languages. They each have their own vocabulary, grammar and features that make them appropriate for particular tasks. The current favourites in primary schools are Scratch, Logo and Kodu. Programs are made up of statements in a limited, but precisely understood, vocabulary. Each statement in the program has one particular meaning. The computer follows the instructions given: nothing more and, almost always, nothing less.

A 'computer' is not just a traditional desktop or laptop PC; it is any device that accepts input, processes it according to a stored program, and produces an output. The input, stored program and output are all encoded as numbers, making these devices 'digital'. Digital devices include the controller in your car or microwave oven, your mobile phone, tablet, laptop and desktop, as well as high-end supercomputers and 'virtual' servers in the 'cloud'.

Create and debug simple programs

The best way for pupils to learn what an algorithm is, and how it can be implemented as a program, is to write some programs themselves. Programming involves taking an idea for doing something and turning it into instructions the computer can understand. In the infant classroom this could be writing a set of commands for a Bee-Bot, Pro-Bot or Roamer, or snapping on-screen program building blocks together in Scratch.

When you write a program you need to have a clear idea of what it will do and how it should do it. This is where algorithms come in, and thinking algorithmically is an integral part of the craft of programming.

Most programs don't work as they should first time round; professional programmers have this experience all the time! One of the most rewarding aspects of programming is finding and fixing these mistakes. Mistakes in programs are called 'bugs', and finding and fixing them is '**debugging**'.

The process of debugging often involves identifying that there is a fault, working out which bit of the program (or underlying algorithm) has caused the problem, and then thinking logically about how to fix it. In the classroom, this can provide a great opportunity for collaborative work.

As a teacher, you should identify clear steps that pupils can follow so that they can fix their code. These might involve identifying what the fault is, finding out which part of the code is creating the problem, and then working towards a fix. Pupils should be encouraged to work together to identify bugs, as programmers are often blind to their own mistakes. Although it might be appropriate to help pupils compare code or identify which section to look at, it is rarely helpful for you to fix a bug for pupils until they have worked through the stages of debugging themselves. Debugging code develops valuable learning skills that are transferable right across the curriculum, such as independence, resilience and persistence.

Use logical reasoning to predict the behaviour of simple programs

Computers are deterministic machines. We can predict exactly how they'll behave through repeated experience or by developing an internal model of how a piece of software works. Stepping through the program can give a clear sense of what it does, and how it does it, giving a feel for the algorithm that's been implemented.

In the classroom, getting one pupil to role-play a floor turtle or screen sprite while another steps through the program can give a far more immediate sense of what's going on. When working with a computer, encourage pupils to make a prediction about what the program will do before they press return or click the button, and to explain their prediction logically; this is part of computer science. **Logical reasoning** also implies that pupils are following a set of rules when making predictions. Pupils who step outside the boundaries of these rules are not using logical reasoning. A pupil who expects a roamer to jump doesn't understand the constraints of its programming language or hardware.

As a school we have agreed a range of programmes and resources to use with pupils to support teachers in planning across the phases with a possible sequence for the units (See Appendix A)

Spiritual, moral, social and cultural development

Computing offers opportunities to support the social development of pupils through the way we expect them to work with each other in lessons. Groupings allow pupils to work together and give them the chance to discuss their ideas and feelings about their own work and the work of others. Their work in general helps them to develop a respect for the abilities of other pupils and encourages them to collaborate and co-operate across a range of activities and experiences. The pupils learn to respect and work with each other and with adults, thus developing a better understanding of themselves. **(See Appendix B)**

Assessment and recording

We assess pupil progress in computing by making informal judgements as we observe them during each lesson. At the end of each year a written report is given to parents about their child's achievements in computing.

(Assessing without levels interactive tool, support teachers when assessing pupils' ability in Computing)

Glossary of terms

This has been developed by the subject leader to support adults and pupils.

(Appendix C)

	Programme of Study	Learning objectives	Key skills
Year 1 **Computer Science**	Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions	• To understand that devices respond to commands • To begin to understand how a computer processes instructions and commands (computational thinking) • To understand that they can programme a simple sequence of commands into a programmable robot or toy to send it on a route	❖ I understand and follow instructions to make something happen so it works ❖ I can control the movement of a floor turtle (eg BeeBot) using single commands (eg FD or RT) ❖ I can control the movement of a floor turtle (eg BeeBot) using MORE THAN ONE command (FD then RT) to make it work well
	Create and debug simple programs	• To plan and write a simple program • To recognise that programs don't always work first time • To recognise a mistake and begin to fix it	
	Use logical reasoning to predict the behaviour of simple programs	❖ To use role play to predict how a program will work ❖ To start to visualise if a program will work (using systematic thinking).	
	Resources	Beebots, Beebot mats Bee bot app Freddie Teddy Playground Cheese Sniffer http://www.iboard.co.uk/iwb/Cheese-Sniffer-657 www.j2ecom/ j2code APPS: Daisy the dinosaur, ALEX	

	Programme of Study	Learning objectives	Key skills
Year 1 **Information Technology**	Use technology purposefully to **create**, **organise**, **store**, **manipulate** and **retrieve** digital content	To complete a simple task on a computer or tablet by following instructions (**create**) To understand how to save work (**store**) To begin to load digital work with support (**retrieve**) To understand how to enter text in to my work (**manipulate**) To understand how to enter numbers in to a computer (**organise**)	I can complete a simple task on a computer or tablet by following instructions I know I need to save my work I can load my digital work (with some help) I can enter text in to my work I understand that you can enter numbers in to a computer (eg to create a pictogram)
	Resources		

	Programme of Study	Learning objectives	Key skills	Resources
Year 1 **Digital Literacy**	Recognise common uses of information technology beyond school	• To understand that information comes from different sources e.g. books, web sites, TV etc • To understand that ICT can give access quickly to a wide variety of resources • To understand how digital technology is used at home and in work. • To be able to explore a variety of electronic information as part of a given topic	❖ I can find different types of information from different sources ❖ I can recognise digital technology used in everyday life ❖ I can start to understand that some work is online (internet based) and some offline	Think you know! 'Think then Click' doc
	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	• To understand that anyone can access the internet. • To understand that personal information should not be shared online • To understand what to do if you are worried **This element will be linked to WRPS E-awareness policy**	I understand that some information is private (eg passwords) and I mustn't share it I know that I can tell a trusted adult if something worries me online Understand 'think then click' agreement	

	Programme of Study	Learning objectives	Key skills
Year 2 / **Computer Science**	Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions	• To understand that an algorithm is a sequence of instructions or step-by-step guide. • To understand that devices or on screen characters are controlled by algorithms, and that these can be inputted using icons and by text. • To create, edit and refine sequences of instructions for a variety of programmable devices.	• I understand that an algorithm is a list of instructions that must be done in the right order • I can create a list of instructions to make things happen really well (eg on device or App) • I can control and debug commands for a BeeBot or Screen Sprite to move it to a given position
	Create and debug simple programs	• To plan and write a simple program • To recognise that programs don't always work first time • To identify a program's bugs and find a logical way of debugging.	• I can explain to others how to create a program (eg a laptop or pc) • I can predict where the BeeBot or Screen Sprite will finish after a list of commands take place
	Use logical reasoning to predict the behaviour of simple programs	❖ To logically predict how a program will work	
	RESOURCES	Beebots Beebot ipad apps Espresso coding Year 2 http://www.espressocoding.co.uk/espresso/coding/index.html	

	Programme of Study	Learning objectives	Key skills
Information Technology Year 2	Use technology purposefully to **create**, **organise**, **store**, **manipulate** and **retrieve** digital content	❖ To use technology to **create** a range of content ❖ To understand how to save and load (**store** and **retrieve**) work on a range of devices ❖ To edit and improve a piece of work (**manipulate**) ❖ To **organise** work	❖ I can use technology to create a range of content (ie text based, image based, number based) ❖ I can save and load (retrieve) my work on a range of devices (eg laptops and tablets) ❖ I can change what is in my work and the look of my work (ie change the format) ❖ I can start to organise my work (eg using file names and folders)
	RESOURCES		

	Programme of Study	Learning objectives	Key skills
Year 2 **Digital Literacy**	Recognise common uses of information technology beyond school	• To talk about the different forms of information (text, images, sound, multimodal) and understand some are more useful than others • To understand and talk about how the information can be used to answer specific questions • To understand how digital technology supports professionals in work.	• Select appropriate buttons to navigate web sites or stored information • Begin to understand that computers use icons, menus, hyperlinks to provide information and instructions • I can begin to understand that not all the content on web sites is true (eg spoof websites) • I can identify some common uses of technology outside of the 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	• To understand that anyone can access the internet. • To understand that personal information should not be shared online • To be aware of age-appropriateness • To understand what to do if you are worried	• I understand some basic rules about how to communicate safely with other people online • I can identify personal information that should be kept private • Understand 'think then click' agreement
	RESOURCES	Think then Click agreement	

This element will be linked to WRPS E-awareness policy

Subject Knowledge for the Key Stage 2 curriculum
(Taken from Computing in the national curriculum. A guide for Primary Teachers 2013)

Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts

The focus on algorithms at key stage 1 leads pupils into the design stage of programming at key stage 2. Algorithms are the necessary start of the process of creating working code, and identifying the steps needed to solve any problem is essential.

Splitting problems into smaller parts is part of computational thinking. For example, designing a game in Scratch will involve thinking about algorithms, programming, drawing sprites and backgrounds, making animations, and even composing music or recording sound effects.

We think of computers as boxes with keyboards, mice and displays, but built-in computers (or 'embedded control systems') are an increasingly significant application of information technology. Pupils can gain valuable insights into how computers are used to monitor and control real-world systems by using sensors, switches, motors and lights. Computers also make it possible to explore real-world situations that would be too difficult, too expensive or too dangerous to create in real life.

Use sequence, selection, and repetition in programs; work with variables and various forms of input and output

Sequence in this context is the step-by-step nature of computer programs, mirroring the sequence of steps the algorithm would list.

Selection refers to instructions such as if ... then ...otherwise decisions in which the operation (what the program does) depends on whether or not certain conditions are met. For example, a quiz provides different feedback if the player answers the question correctly or incorrectly. It is helpful to refer pupils to selections (choices) they make in everyday life; for example, if it rains in the morning, then I will wear my anorak to school, otherwise I won't.

Repetition is a programming structure such as a repeat ... until loop in which the computer runs part of the program a certain number of times or until a particular condition is met.

In the case of the quiz, we might want to ask ten questions, or keep going until the player has scored five correct answers. Again, it is useful to refer pupils to loops or repetition in daily routines. For example, the traffic lights on a pelican crossing will stay green until someone presses the button to cross the road; an oven heats up until it reaches the right temperature. There are many loops in

the wider world, such as the days of the week or the moon travelling around the Earth.

Variables are used to keep track of the things that can change while a program is running. They are a bit like x or y in algebra, in that the values may not initially be known. Variables are not just used for numbers. They can also hold text, including whole sentences ('strings'), or the logical values 'true' or 'false'. For our quiz we would use variables to keep track of the player's score and the number of questions they attempt. Variables are like boxes, in that the computer can use them to store information that can be changed by the user, the program or by another variable.

We may think of input as keyboard and mouse (or touch screen), and output as the computer display, but pupils' experiences should be widened beyond this. Working with sound is straightforward, as laptops have built-in microphones and speakers. The latest version of Scratch provides support for using webcams. Digital cameras allow interesting work using image files.

The reference in the programme of study to 'controlling physical systems' implies the use of sensors, motors and perhaps robotics. Midi instruments like an electronic keyboard, and devices such as MaKey MaKey6 and Microsoft Kinect provide yet further experience of working with various forms of input.

Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

Key stage 2 pupils should be able to explain the thinking behind their algorithms, talking through the steps and explaining why they've solved a problem the way they have. They also need to be able to look at a simple programming project and explain what's going on. This is made easier with languages like Scratch, Kodu and Logo, which feature an on-screen sprite or turtle. The immediate feedback helps pupils to understand and debug their programs. Pupils might also be expected to look at someone else's algorithm and explain how it does what it does.

Thinking through programs and algorithms helps develop pupils' abilities to think logically and algorithmically, which leads to planned debugging of code rather than just a trial-and-error approach.

	KS2 **Programme of Study**	**Learning objectives**	**Key skills**
Year 3 — Computer Science	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts	• To understand that an open ended problem can be broken up into smaller parts. • To describe and create an algorithm to achieve a specific outcome. • To recognise when to test a program and recognise when to debug it.	• I can understand that usually a problem can be broken up into smaller parts. • I can create an algorithm to make something happen successfully. I can talk about it. • I know when to test a program and when to debug it if it doesn't work
	Use sequence, selection, and repetition in programs	• To understand that repeating instructions can save time and make a program simpler.	• I can understand that repeating instructions can save time and make a program simpler. • I can explain how a simple program works
	Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	❖ To explain how a program will work using vocabulary such as Input and Output. ❖ To predict possible outcomes of a planned algorithm.	• I can predict some of the things that may happen BEFORE I run my program
	RESOURCES	Espresso coding Year 3 http://www.espressocoding.co.uk/espresso/coding/index.html Scratch Lego We Do Scratch junior Hopscotch	

	Programme of Study	Learning objectives	Key skills
Information Technology Year 3	Use search technologies effectively	To communicate ideas using the right software and formats (**select**) To understand that appropriate messages can be sent digitally (eg email) To understand how to use an appropriate search engine effectively	• I can communicate my ideas well using the right software and formats • I understand that appropriate messages can be sent digitally (eg email)
	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	To use software to effectively **collect** and **present** data. To present interesting and clear information.	• I can use an appropriate search engine effectively (eg kidrex to search facts about Stone Age Man) • I can use software to collect and present data in a way that is easy to understand • I can create a presentation to that is easy to understand and that is interesting
	RESOURCES		

	Programme of Study	Learning objectives	Key skills
Year 3 **Digital Literacy**	Understand the opportunities networks offer for communication and collaboration	❖ To understand how to save and retrieve work on the Internet, the school network and a personal device. ❖ To understand how to communicate with others online. ❖ To understand that the World Wide Web is the part of the Internet that contains websites.	❖ I understand how to save and get back (retrieve) data on the school network and a hand held device such a tablet computer ❖ I understand some simple rules about how to communicate safely with other people online
	Be discerning in evaluating digital content	• To recognise search tools to find and use appropriate website • To understand that not all online images should be used	❖ I understand that the World Wide Web contains lots of web pages about different subjects ❖ I can begin to understand that not all the information on web sites is true (eg spoof websites)
	Use technology safely, respectfully and responsibly; recognise acceptable and unacceptable behaviour; identify a range of ways to report concerns about content and contact. online technologies	• To understand that anyone can access the internet. • To understand that personal information should not be shared online • To be aware of age-appropriateness • To understand what to do if you are worried **This element will be linked to WRPS E-awareness policy**	❖ I can identify personal information that should be kept private and not shared online ❖ I can recognise age appropriate symbols (eg for games and films) to keep me safe ❖ Understand and follow 'think then click' agreement
	RESOURCES	Safe search engines: http://www.bbc.co.uk/cbbc/find/ http://www.kidrex.org/ http://primaryschoolict.com Think you know! Think then Click agreement	

	KS2 **Programme of Study**	**Learning objectives**	**Key skills**
Year 4 ***Computer Science***	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts	• To recognise an error in a program and debug it so that it works. • Understand that algorithms will help the user to solve problems. • Understand that using algorithms will also help solve problems in other subjects • To recognise the need to test and retest whilst a program is being developed.	❖ I can recognise an error in a program and debug it so that it works ❖ I can understand that algorithms (step by step instructions) will help the user to solve problems. ❖ I can recognise the need to test and retest whilst a program is being developed (using my prediction skills of what MIGHT work)
	Use sequence, selection, and repetition in programs.	• To understand that a program is built up of sequences of instructions. • To understand that many programs can follow more than one route. • To understand that repeating instructions can save time and make a program simpler.	❖ I can understand that a program is built up of sequences of instructions that are in order ❖ I understand that many programs can follow more than one route (more than one thing can happen) (eg IF THEN statements)
	Use logical reasoning to explain how some simple algorithms work.	❖ To predict and explain how a program will work. ❖ To simplify a program if necessary (to make it work more efficiently)	❖ I understand that repeating instructions can save time and make a program more efficient
	RESOURCES	Espresso coding Year 4 http://www.espressocoding.co.uk/espresso/coding/index.html Scratch Lego We Do	

	Programme of Study	Learning objectives	Key skills
Information Technology _Year 4_	Use search technologies effectively	• To use advanced features of applications to **present** ideas and work clearly	❖ I can use some of the more advanced features of applications (not just change font) to present my ideas and work clearly
	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	• To combine more than one source of information into a piece of work • To **evaluate** digital work • To recognise and **evaluate** appropriate search engines • To use software to **collect**, **present** and **analyse** data appropriately. • To understand how to **create** and **edit** a presentation to convey meaning.	❖ I can combine more than one source of information (eg text, picture, video, animation, sound) in my work ❖ I can evaluate my digital work to see if it has met the target or goal set for me. ❖ I can use an appropriate search engine effectively (eg Kidrex) and judge if the information is useful to me ❖ I can use software to collect, present and analyse data appropriately. (eg to make a chart) ❖ I can create a presentation to convey meaning and edit it if necessary (eg on Powerpoint)
	RESOURCES		

	Programme of Study	Learning objectives	Key skills
Digital Literacy (Year 4)	Understand the opportunities networks offer for communication and collaboration	• To recognise resources from the Internet, the school network or a personal device. • To understand that a hyperlink can take you directly to the world wide web	❖ Use appropriate tools to collaborate on-line. ❖ Use various sources to find information and consider the reliability ❖ I can identify some common uses of technology outside of school ❖ I use technology safely and respectfully considering other people's feelings ❖ I can identify personal information that should be kept private ❖ I know how I can get help and support if I am worried when using a computer ❖ Recognise appropriate age restriction symbols ❖ Understand and follow 'think then click' agreement
	Be discerning in evaluating digital content	• To understand that information is not always reliable • To understand that key words can help to search safely on the internet • To understand that not all online images should be used	
	Use technology safely, respectfully and responsibly; recognise acceptable and unacceptable behaviour; identify a range of ways to report concerns about content and contact. online technologies	• To understand that anyone can access the internet. • To understand that personal information should not be shared online • To be aware of age-appropriateness • To understand what to do if you are worried	
		This element will be linked to WRPS E-awareness policy	
	RESOURCES	Safe search engines: http://www.bbc.co.uk/cbbc/find/ http://www.kidrex.org/ http://primaryschoolict.com Think you know! CEOP Think then Click agreement	

	KS2 **Programme of Study**	**Learning objectives**	**Key skills**
Year 5 **Computer Science**	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.	• To recognise an error in a program and debug it so that it works. • Understand that algorithms will help to solve and sequence more complex programs. • Understand that using algorithms will also help solve problems in other subjects • To recognise the need to test and retest whilst a program is being developed.	❖ Create an algorithm that contains step by step instructions to solve a problem. ❖ I can use a range of sensing tools (eg within programs such as Scratch) to control what happens (eg based on the position of the sprite, mouse position or inputs such as sound level) ❖ I recognise the need to test and retest whilst a program is being developed • I understand that any system requires input devices (eg keyboard) and output devices (3D printer) • I can understand that repeating instructions can save time and make a program simpler. (eg create a LOOP) ❖ Use prior knowledge to make reasonable predictions about what will happen when a program is run. ❖ I can recognise an error in a program, debug the program and explain the changes I have made
	Use sequence, selection, and repetition in programs; work with variables and various forms of input and output	• To understand that input is data that goes into a computer system. • To understand that output is information that comes out of a computer system. • To understand that repeating instructions can save time and make a program simpler.	
	Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	❖ To predict and explain how a program will work ❖ To correct a program if it doesn't work (debug)	
	RESOURCES	Espresso coding Year 5 http://www.espressocoding.co.uk/espresso/coding/index.html Scratch	

	Programme of Study	Learning objectives	Key skills
Information Technology — Year 5	Use search technologies effectively	• To recognise a range of search engines • To understand that work can be saved in a range of places	❖ I am aware of several different search engines and can explain some of their differences (eg Kidrex, Google, Bing) ❖ I understand that my work can be saved in a range of places (the device itself, USB stick, or 'in the cloud')
	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	• To combine more than one source of information into a piece of work • To use software to **collect**, **present** and **analyse** data appropriately. • To **create** and **edit** information in a presentation	❖ I can combine more than one source of information (eg placing text, picture, video, animation, sound into a blog) in my work and can present this well to other people ❖ I can use software to collect, present and analyse data appropriately. I can explain what I have done to other people. ❖ I can create and edit a presentation to provide information clearly and can include hyperlinks in it (eg using Powerpoint or Keynote)
	RESOURCES	Wordpress (blog)	

	Programme of Study	Learning objectives	Key skills
Year 5 **Digital Literacy**	Understand the opportunities networks offer for communication and collaboration	❖ To recognise and name different parts of the Internet. ❖ To understand the different parts of a webpage. ❖ To understand that the internet can be used to communicate	❖ I understand that computers can be linked together to create a network and that this can help me working with others online (collaboration) ❖ I can name a range of useful ways in which technology can be used outside school
	Be discerning in evaluating digital content	• To understand and evaluate different types of information found on the World Wide Web. • To understand that not all online images should be used • To understand that the information on a webpage has been created by a person.	❖ I understand that the World Wide Web is one way in which the Internet can be used ❖ I can find some websites that are both useful and reliable (based on the author of the site)
	Use technology safely, respectfully and responsibly; recognise acceptable and unacceptable behaviour; identify a range of ways to report concerns about content and contact. online technologies	• To understand that personal information should not be posted or shared online • To understand the social etiquette required when communicating online. • To be aware of age-appropriateness • To understand that computer virus' can harm your computer. • To understand what to do if you see inappropriate content.	❖ I can describe some of the risks of sharing too much information online ❖ Recognise appropriate age restriction symbols ❖ Understand and follow 'think then click' agreement ❖ I understand how I can report worries I have when using the Internet
		This element will be linked to WRPS E-awareness policy	
	RESOURCES	Safe search engines: http://www.bbc.co.uk/cbbc/find/ http://www.kidrex.org/ http://primaryschoolict.com Think you know! CEOP, Childline Think then Click agreement	

	Programme of Study	Learning objectives	Key skills
Year 6 Computer Science	Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.	• To recognise errors in programs and debug them so that they work. • Understand that algorithms will help to solve and sequence more complex programs. • To retest a program whilst under development.	❖ To predict what a program will do by looking at a sequence of instructions. ❖ I can write programs to do what I want them to do. I can test and debug these. ❖ I can create or use a simulation of a real (physical) system (such as a robot, spacecraft, machine or production line) ❖ I can control a physical system using a range of commands (eg robot, LEGO Wedo robot, 3d printer, CAD output device)
	Use sequence, selection, and repetition in programs; work with variables and various forms of input and output	• To understand the relationships between Input, Process and Output • To understand that repeating instructions can save time and make a program simpler. • To understand that data can change in value (variable) • To understand that a program can take different routes (selection)	❖ I understand that any system requires input devices (eg keyboard) and output devices (3d printer) and that the system processes the data ❖ I understand that variables can be used to make a game more realistic (eg a timer or a score) ❖ I can use IF THEN ELSE commands to control what happens. (eg in Scratch
	Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	❖ To predict and explain how a program will work ❖ To simplify a program to work more efficiently or make it easier to understand. ❖ To correct a program if it doesn't work (debug) ❖ To understand that different parts of a computer program have to communicate with each other e.g one sprite can send a message to another	❖ Use prior knowledge to make reasonable predictions about what will happen when a program is run. ❖ Evaluate algorithms planned by others and identify any problems and the expected outcome ❖ I can BROADCAST information to trigger another event (eg in Scratch)
	RESOURCES	Espresso coding Year 6 http://www.espressocoding.co.uk/espresso/coding/index.html Scratch	

	Programme of Study	Learning objectives	Key skills
Information Technology *Year 6*	Use search technologies effectively	To explain the features of different search engines . To understand and explain how work can be saved in a range of places	❖ I am aware of several different search engines and can explain some of their features e.g Kidrex, google, Bing ❖ I understand that my work can be saved in a range of places (the device itself, USB stick, or 'in the cloud') and can talk about this
	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	To **select**, **use** and **combine** a variety of software effectively To combine several sources of information into a piece of work. To use software to **collect**, **present**, **analyse** and **evaluate** data appropriately To **create** and **edit** a presentation with hyperlinks	❖ I can select, use and combine a variety of software effectively (including internet services) to meet the goals I have been set ❖ I can combine several sources of information (eg text, picture, video, **animation**, sound) in my work to meet the goal I have been set ❖ I can use software to collect, present, analyse and evaluate data appropriately (eg using a spreadsheet and/or a database) ❖ I can create and edit a presentation to convey meaning and include non-linear hyperlinks in it (eg Powerpoint or Keynote) ❖ I can present data and information in a way that is easy to understand.
	RESOURCES	Animation	

	Programme of Study	Learning objectives	Key skills
Year 6 **Digital Literacy**	Understand the opportunities networks offer for communication and collaboration	❖ To understand the range of communication available on the internet. ❖ To understand how information is transported on the internet,	❖ I can name some of the ways that networks allow you to cooperate and collaborate with other people ❖ I can describe why some World Wide Web pages are more useful and reliable than others ❖ Recognise the risks of sharing information, photographs online ❖ Recognise appropriate age restriction on the internet including social networking application ❖ I can describe some ways in which technology should be used safely, respectfully and responsibly. ❖ Understand and follow 'think then click' agreement ❖ I understand how I can report worries I have when using the Internet. I know how to help other people if I need to. ❖ I understand that computer networks (including the internet) provide people with a range of services (including the World Wide Web) ❖ I can name some of the dangers of communicating and collaborating with others online ❖ I understand that it is illegal to download or copy material (without the written permission of the owner) and know about 'creative commons'
	Be discerning in evaluating digital content	• To understand and evaluate different types of information found on the World Wide Web. • To understand that not all online images should be used • To understand that the information on a webpage has been created by a person.	
	Use technology safely, respectfully and responsibly; recognise acceptable and unacceptable behaviour; identify a range of ways to report concerns about content and contact. online technologies	• To understand that personal information should not be posted or shared online • To understand the social etiquette required when communicating online. • To be aware of age-appropriateness • To understand what to do if you see inappropriate content.	
		This element will be linked to WRPS E-awareness policy	
	RESOURCES	Safe search engines: http://www.bbc.co.uk/cbbc/find/ http://www.kidrex.org/ http://primaryschoolict.com Thinkuknow! Caught in the web (Lucy's story) , CEOP, Child line,Think then Click agreement	

Example of strand coverage over a year see Whole School Curriculum Maps

Year group	first Autumn	second Autumn	first Spring	second Spring	first Summer	second Summer
1	Computer Science IT DL(1 lesson)	IT DL(1 lesson)	Digital Literacy Block IT	IT DL(1 lesson)	Computer Science IT DL(1 lesson)	Information Technology block DL(1 lesson)
2	Computer Science IT DL(1 lesson)	IT DL(1 lesson)	Digital Literacy Block IT	Information Technology block DL(1 lesson)	IT DL(1 lesson)	Computer Science IT DL(1 lesson)
3	DL(1 lesson) IT	Computer Science IT DL(1 lesson)	Digital Literacy Block IT	IT DL(1 lesson)	IT DL(1 lesson) Information Technology block	Computer Science IT DL(1 lesson)
4	Computer Science DL(1 lesson) IT	Information Technology block DL(1 lesson)	DL(1 lesson) IT	Digital Literacy Block IT	IT DL(1 lesson)	Computer Sc IT DL(1 lesson)
5	Computer Science IT DL(1 lesson)	IT DL(1 lesson)	Digital Lit Information Technology block	IT DL(1 lesson)	Computer Science IT DL(1 lesson)	
6	DL(1 lesson) Information Technology block	Computer Science IT DL(1 lesson)	Digital Literacy Block IT	IT DL(1 lesson)	IT DL(1 lesson)	Computer Science IT DL(1 lesson)

Computer Science- Two blocks a year

Information Technology- One main block a year (Richard Smith) to develop skills in a specific area e.g Animation. IT will also be taught discreetly across most areas of the curriculum

Digital Literacy- One block a year (Spring term) and one lesson at the beginning of each half term to remind children of E-Safety and our school's Think then Click agreement.

SMSC within Computing at William Reynolds Primary School and Nursery

<table>
<tr><td colspan="2" style="background-color:#f5c6a0;">Pupils' spiritual development is shown by their
• Ability to be reflective about their own beliefs, religious or otherwise, that inform their perspective on life and their interest in and respect for different people's faiths, feelings and values
• Sense of enjoyment and fascination in learning about themselves, others and the world around them
• Use of imagination and creativity in their learning
• Willingness to reflect on their experiences</td></tr>
<tr><td>Foundation Stage</td><td>Using technological devices in roleplay to imagine real life experiences where adults may use ICT.
Using paint programs to create pictures and images.</td></tr>
<tr><td>Year 1
Year 2
Year 3
Year 4
Year 5
Year 6</td><td><u>**Computer Science**</u>
Computer science is taught in each year group for a minimum of two half terms, where it links to the overarching theme. Computer science is the core of computing where pupils are taught how digital systems work. Having been taught the key skills, children can then use their own imagination to create their own programs. Children then share, evaluate and reflect upon their designs and experiences.
In the Autumn Term, Children in Year three and four create their own maze games.
In Year two, in the summer term children create their own pirate game using coding.
In the Summer Term, Year 5 children develop a sense of the world around them by creating a rivers game, linked to geography.
In the Autumn term, Year 6, children create a clock counter to be shared with children throughout school.
<u>**Information Technology**</u>
In Information Technology children use their computer science knowledge to create programs, systems and produce content. They gain a sense of enjoyment and fascination in learning about themselves and the world around them. They use their creativity to produce content related to all curriculum areas, through text and images.
In the summer term, children in Year 1 gain a sense of enjoyment and awe in how plants change and grow. They use their imagination by creating a plant animation to document the change in a sunflower and their sense of fascination is developed by exploring time lapse films of broad beans growing.</td></tr>
</table>

Whole School
Our three, termly global themes are presented in whole school assemblies using images, music and key questions delivered through technological devices and carefully selected from the internet. This enables children to be reflective about their own beliefs and religions and to gain an interest in and respect for different people's faiths, feelings and values.

Pupils' moral development is shown by their	
- Ability to recognise the difference between right and wrong readily apply this understanding in their own lives and, in so doing, respect the civil and criminal law of England - Understanding of the consequences of their behaviour and actions - Interest in investigating and offering reasoned views about moral and ethical issues, and being able to understand and appreciate the viewpoints of others on these issues	
Foundation Stage	During self-initiated children have access to a range of technological devices including computers, ipads, listening stations and cameras. Children are taught to know the right and wrong way to use these technological items.
Year 1	**Digital Literacy**
Year 2	Digital Literacy is the evaluating and reflecting on the use of software and the internet. It will prepare children for the future workforce and allows them to make the right choice when selecting technological tools and information.
Year 3	During the Autumn term, Year 2 considers how the stay safe at home and how we use the computers safely at school.
Year 4	Children learn how to log on with a private password and discuss why it is important to have a children's log in.
Year 5	As children work through year two, they consider the moral questions such as ;
Year 6	*How can you keep safe whilst using the internet at home, school and in public places?* *Can I trust everything that I find out about on the internet?* *How secure are the images that are posted onto the internet?* They also develop an understanding of the copyright of images under British law. By the end of Year 6, children can investigate and offer reasoned views about moral and ethical issues related to the use of the internet.
Whole School	

All children and parents sign up and agree to our school E-Awareness policy, The Think then Click agreement. This offers advice and guidance between right and wrong when using the internet, in order to keep themselves and their children safe.

Pupils' social development is shown by their
- Use a range of social skills in different contexts, including working and socialising with pupils from different religious, ethnic and socio-economic backgrounds
- Willingness to participate in a variety of communities and social settings, including by volunteering, cooperating well with others and being able to resolve conflicts effectively
- Acceptance and engagement with the fundamental British values of democracy, the rule of law, individual liberty and mutual respect and tolerance of those with different faiths and beliefs; the pupils develop and demonstrate skills and attitudes that will allow them to participate fully in and contribute positively to life in modern Britain

Foundation Stage	Children use digital recording microphones and talking pegs to share ideas and communicate with each other and with other adults. Children learn to take turns to use the technological equipment fairly, they also share their knowledge of how to use software with each other during self-initiated time.
Year 1 Year 2 Year 3 Year 4 Year 5 Year 6	**Digital Literacy** Digital Literacy is the evaluating and reflecting on the use of software and the internet. **Computer science** Children are encouraged to cooperate with each other and listen to each other's ideas and opinions. They evaluate how things work and how they could change the instructions to make them work more effectively. In the autumn term, the Year 1 children work collaboratively to direct a bear (another child) back to the cave. In Year two children work collaboratively to predict how something will work. They work as a team to create an algorithm to get a caterpillar (programmable toy) across a vegetable patch. By Key stage 2 children develop and demonstrate skills (in programming) and attitudes that will allow them to participate fully in, and contribute positively, to life and work in modern Britain. Children learn the skills of creating a program and detecting where there is a problem and how they are going to resolve it.

	In the Autumn Term, children in Year three and four create their own maze games and reflect on whether it has worked successfully. In the Summer Term, Year 5 children develop a sense of the world around them by creating a rivers game, linked to geography. In the Autumn term, Year 6, children create a clock counter to be shared with children throughout school.

Whole School
Through a range of subject related software subscription, for example Mathletics and Bug Club children are offered safe learning environments where they can communicate and work alongside children within the local environment as well as pupils from different social, religious, ethnic and socio –economic backgrounds.

Pupils' cultural development is shown by their
- Understanding and appreciation of the side range of cultural influences that have shaped their own heritage and that of others
- Understanding and appreciation of the range of different cultures within school and further afield as an essential element of their preparation for life in modern Britain
- Knowledge of Britain's democratic parliamentary system and its central role in shaping our history and values, and in continuing to develop Britain
- Willingness to participate in and respond positively to artistic, sporting and cultural opportunities
- Interest in exploring, improving understanding of and showing respect for different faiths and cultural diversity, and the extent to which they understand, accept, respect and celebrate diversity, as shown by their tolerance and attitudes towards different religious, ethnic and socio-economic groups in the local, national and global communities

Foundation Stage	Children find out about local, national and global cultural events using video clips for Chinese New Year and Child In Need. Children learn about their local area using Google Maps.
Year 1	**Digital Literacy**
Year 2	Digital Literacy is the evaluating and reflecting on the use of software and the internet. Children learn how to
Year 3	research safely to find out about the past and the wider world. They explore their year group themes by watching

Year 4	video clips, images and reading information to find out more about their own heritage and that of others.
Year 5	**<u>Information Technology</u>**
Year 6	In Information Technology children use their computer science knowledge to create programs, systems and produce content. During Key stage One; children celebrate Mothering Sunday by typing Mother's Day poems and creating cards. In Year Two, children research what life is like for children in Brazil. They watch video clips of children living in Favelas and compare it to their own lives. Using Google Maps they compare their local environment with the wider world. In Year 4 children use search engines to research the Five Pillars of Islam before writing a report. Music to the 4 offers children in Year 1, 3 and 5 a chance to develop their music technology skills using music and sampling technology. In RE, Year 5 children learn about charity and helping people by researching the work of Christian Aid in Britain and the wider world.

Whole School

Through assemblies and whole school themes, children participate and celebrate in cultural, sporting and national events including Red nose day, World Book Day, The Olympics and the Eclipse. Children have access to these events by watching live feeds and historical archive footage. A range of music related to our global themes and selected for its diversity, in terms of genre and cultural mix is played and discussed during weekly assemblies.

Glossary

algorithm – an unambiguous procedure or precise step-by-step guide to solve a problem or achieve a particular objective.

computer networks – the computers and the connecting hardware (wifi access points, cables, fibres, switches and routers) that make it possible to transfer data using an agreed method ('protocol').

control – using computers to move or otherwise change 'physical' systems. The computer can be hidden inside the system or connected to it.

data – a structured set of numbers, representing digitised text, images, sound or video, which can be processed or transmitted by a computer.

debug – to detect and correct the errors in a computer program.

digital content – any media created, edited or viewed on a computer, such as text (including the hypertext of a web page), images, sound, video (including animation), or virtual environments, and combinations of these (i.e. multimedia).

information – the meaning or interpretation given to a set of data by its users, or which results from data being processed.

input – data provided to a computer system, such as via a keyboard, mouse, microphone, camera or physical sensors.

internet – the global collection of computer networks and their connections, all using shared protocols (TCP/IP) to communicate.

logical reasoning – a systematic approach to solving problems or deducing information using a set of universally applicable and totally reliable rules.

output – the information produced by a computer system for its user, typically on a screen, through speakers or on a printer, but possibly though the control of motors in physical systems.

program – a stored set of instructions encoded in a language understood by the computer that does some form of computation, processing input and/or stored data to generate output.

repetition – a programming construct in which one or more instructions are repeated, perhaps a certain number of times, until a condition is satisfied or until the program is stopped.

search – to identify data that satisfies one or more conditions, such as web pages containing supplied keywords, or files on a computer with certain properties.

selection – a programming construct in which the instructions that are executed are determined by whether a particular condition is met.

sequence – to place programming instructions in order, with each executed one after the other.

services – programs running on computers, typically those connected to the internet, which provide functionality in response to requests; for example, to transmit a web page, deliver an email or allow a text, voice or video conversation.

simulation – using a computer to model the state and behaviour of real-world (or imaginary) systems, including physical and social systems; an integral part of most computer games.
software – computer programs, including both application software (such as office programs, web browsers, media editors and games) and the computer operating system. The term also applies to 'apps' running on mobile devices and to web-based services.

variables – a way in which computer programs can store, retrieve or change simple data, such as a score, the time left, or the user's name.

World Wide Web – a service provided by computers connected to the internet (web servers), in which pages of hypertext (web pages)
are transmitted to users; the pages typically include links to other web pages and may be generated by programs automatically.