Computing

Curriculum Plan

National Curriculum from September 2014

Southridge First School

Computing Long Term Plan

Key Focus: CS-Computer Science IT-Information Technology DL-Digital Literacy

Computing
Purpose of study
A high-quality computing education equips pupils to understand and change the world through logical thinking and creativity, including by making links with mathematics, science, and design and technology. The core of computing is computer science, in which pupils are taught the principles of information and computation, and how digital systems work. Computing equips pupils to use information technology to create programs, systems and a range of media. It also 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.

Aims:
The national curriculum for computing aims to ensure that all pupils:
- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

Subject content for Key Stage 1
Pupils should be taught to:
- understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- create and debug simple programs
- use logical reasoning to predict the behaviour of simple programs
- use technology purposefully to create, organise, store, manipulate and retrieve digital content
- use technology safely and respectfully, keeping personal information private; know where to go for help and support when they have concerns about material on the internet
- recognise common uses of information technology beyond school.

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Subject content for Key Stage 2
Pupils should be taught:
- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world-wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- use technology safely, respectfully and responsibly; know a range of ways to report concerns and inappropriate behaviour select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals,
- including collecting, analysing, evaluating and presenting data and information.

Attainment targets:
By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

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Year 1		Key focus of unit
Autumn 1	**Exploring Machines We Control** ● understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions ● use logical reasoning to predict the behaviour of simple programs Introduction to control-opportunity to explore and discuss how we control machines in different ways. Examples: TV remote, toys at home, automatic doors at the supermarket, touch screens etc. BeeBots Cubelets-available from the CLC on loan I-pads app: Daisy The Dinosaur I.T. Focus- Using a paint package to draw dinosaurs. Use elipse/rectangle to create the shape for the dinosaur. Teach the use of the shift key to draw square instead of rectangle and a circle instead of elipse. Use Fill Tool to create patterns Save and retrieve file.	C.S.
Autumn 2	**Programming Direction** ● understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by ● following precise and unambiguous instructions ● create and debug simple programs ● use logical reasoning to predict the behaviour of simple programs Writing programs to control a turtle or on screen turtle. Cover beebots with pirate/pirate ship/parrot designs. Create algorithms to direct beebot around an island. 2Go from the 2Simple collection BeeBots	C.S,

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	2ControlNXT from the 2Simple collection	
Spring 1	**Animal Facts** ● use logical reasoning to predict the behaviour of simple programs ● use technology purposefully to create, organise, store, manipulate and retrieve digital content ● use technology safely and respectfully, keeping personal information private; know where to go for help and support when they have concerns about material on the internet ● recognise common uses of information technology beyond school. (Sorting. Computational thinking) 3 lessons Cross curricular- searching for animal facts- making fact sheets Searching- E-safety Children will learn to search the internet for facts about animals based on certain criteria, building up a batabase of information. They will combine their data using 'google docs' to create a database where they can all collaborate and access/search etc.	D.L.
Spring 2	**Action Algorithms** ● understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions ● create and debug simple programs ● use technology purposefully to create, organise, store, manipulate and retrieve digital content The Human Crane- creating and debugging algorithms to move a block from one cup to another, using their hand. E.g. close fingers to grip the LEGO block. Links with dance- write/draw algorithms for a dance, stating which body parts will move and in which order. Use 2Create to create an algorithm for a simple recipe.	C.S.

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Summer 1	**Exploring Digital Sound- Party time** ● use technology purposefully to create, organise, store, manipulate and retrieve digital content ● use technology safely and respectfully, keeping personal information private; know where to go for help and support when they have concerns about material on the internet ● recognise common uses of information technology beyond school. Children will have the opportunity to experiment with and apply learnt skills to at least 2 of these programs. 2explore, 2beat, 2play, 2sequence, Isleoftune.com, Audacity, ComposeWorld2 Cross curricular- make party invitations, menus etc. Medieval party.	I.T.
Summer 2	**Digital Story Books** ● understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions ● create and debug simple programs ● use logical reasoning to predict the behaviour of simple programs ● use technology purposefully to create, organise, store, manipulate and retrieve digital content ● recognise common uses of information technology beyond school. 2 Create a story Digital literacy focus- How stories have evolved. How do we tell stories now?-Kindle etc. Mr Chandler as a possible parent helper to talk about stories through Aboriginal art. Create own digital stories, planning the order of the content of each page. Create text, illustrations, add sound and possibly record narration of the text.	C.S.

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Year 2		Key focus of unit
Autumn 1	**Automated Lighthouse** ● understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions ● create and debug simple programs ● use logical reasoning to predict the behaviour of simple programs ● recognise common uses of information technology beyond school. Light houses-use light house app on the ipads to look at the different sequences of light flashes etc for different light houses. Make torches/use torches-children become the light house 2NXT-clock function to time when light comes on/goes off (on screen) Write instructions/algorithms to make an identifiable light house sequence (physically) Use cubelets-built it instruction- motor/light etc	C.S.
Autumn 2	**An Introduction to Digital Art** ● recognise common uses of information technology beyond school. ● use technology purposefully to create, organise, store, manipulate and retrieve digital content ● use technology safely and respectfully, keeping personal information private; know where to go for help and support when they have concerns about material on the internet Use various digital art tools including importing photographs and manipulating them. Colour Magic/2Paint/Sumo Paint-online free version	D.L.

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Spring 1	**Exploring Digital Sound-Katie Morag, The Island** ● use technology purposefully to create, organise, store, manipulate and retrieve digital content ● use technology safely and respectfully, keeping personal information private; know where to go for help and support when they have concerns about material on the internet ● recognise common uses of information technology beyond school. Children will have the opportunity to experiment with and apply learnt skills to at least 2 of these programs. 2explore, 2beat, 2play, 2sequence, Isleoftune.com, Audacity, ComposeWorld2	I.T.
Spring 2	**An Introduction To Animation** ● recognise common uses of information technology beyond school. ● use technology purposefully to create, organise, store, manipulate and retrieve digital content An introduction to animations. Understanding that animations are made up of a number of still images. 2Animate iMotion HD for the i-pads Borrow web cams from CLC	I.T.

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Summer 1	**Making Multimedia Stories** ● recognise common uses of information technology beyond school. ● use technology purposefully to create, organise, store, manipulate and retrieve digital content Investigate multimedia stories and create own linked to topic work. 2simple Talking Stories, 2create a story	I.T.
Summer 2	**All About Algorithms** ● understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions ● create and debug simple programs ● use logical reasoning to predict the behaviour of simple programs ● recognise common uses of information technology beyond school. Direction sequences- 2Go or Beebots Creating own robot instructions- understanding that instructions need to be precise. Brushing teeth, building a simple lego model etc. WEDO logo- tweeting Birds Build lego model and write algorithm to control their movement and sound.	C.S.

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Year 3		Key focus of unit
Autumn 1	**.Animation and Storytelling** - design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts - use sequence, selection, and repetition in programs; work with variables and various forms of input and output - use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs Planning a story and producing an animated version. This could be linked to a Literacy Unit or a perhaps the World War II topic. Software to be used- Scratch. The children will be learning about: coordinates; writing simple algorithms; debugging and forms of input and output in the form of the 'Broadcast' command. Code breaking?	C.S.
Autumn 2	**Programming with Logo** - design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts - use sequence, selection, and repetition in programs; work with variables and various forms of input and output - use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs 3 or 4 lessons focusing on Programming 2 or 3 weeks using google earth/maps to investigate places and plan routes/directions Programming a screen turtle. Write and debug algorithms. Write procedures and repeat procedures to avoid repeating the code. LOGO from 2Control NXT/Blackcat LOGO/Scratch/Google Earth/maps	C.S.

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Spring 1	**How The Internet Works** ● select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information. ● use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content ● use technology safely, respectfully and responsibly; know a range of ways to report concerns and inappropriate behaviour Google spreadsheets/Data collection Inventions from Stone age-research. Look at inventions now- ipads Who are they for? Set constraints-car phone warehouse £12 month etc Collect information on inventors. Create a simple database.	D.L.
Spring 2	**Lego-Wedo Controlling Machines** ● design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts ● use sequence, selection, and repetition in programs; work with variables and various forms of input and output ● use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs Children are introduced to various mechanisms used in fairground rides. They will consider how they are controlled and how they move. They will build various rides out of Technic Lego then write and debug programs to control the rides.	C.S.

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Summer 1	**An Introduction to Building a Website** ● understand computer networks including the internet; how they can provide multiple services, such as the world-wide web; and the opportunities they offer for communication and collaboration ● use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content ● use technology safely, respectfully and responsibly; know a range of ways to report concerns and inappropriate behaviour ● select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information. Design and make a website using google sites based on the history topic. Training from Claire Graham E-safety	D.L.
Summer 2	**Research and Present** ● use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content ● use technology safely, respectfully and responsibly; know a range of ways to report concerns and inappropriate behaviour ● select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information. Presentation on an aspect of France Sport/food/school/weather Powerpoint or google presentation Using Google Maps/Earth for research and screen grabs	I.T.

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Year 4		Key focus of unit
Autumn 1	**Communication & Collaboration** ● understand computer networks including the internet; how they can provide multiple services, such as the world-wide web; and the opportunities they offer for communication and collaboration ● use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content ● use technology safely, respectfully and responsibly; know a range of ways to report concerns and inappropriate behaviour ● select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information. Children will learn to use their Email in conjunction with Google docs to collaborate in the collection of information and ideas. They will then collaborate to produce a presentation about an aspect of Ancient Egypt. Due to the nature of this Computing unit, children could collaborate as part of their homework. They will learn about using the internet/email safely and respectfully. They will also learn about using the content of the internet safely, effectively and with consideration to copyright law.	D.L.
Autumn 2	**Programming Presentations** ● design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts ● use sequence, selection, and repetition in programs; work with variables and various forms of input and output ● use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs	C.S.

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	Scratch- program a sequence of instructions to present an animation of the water cycle. Add in narration or background music.	
Spring 1	**Programming Games With Kodu** ● design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts ● use sequence, selection, and repetition in programs; work with variables and various forms of input and output ● use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs Create a working game using the free Microsoft tool-Kodu. Create world, characters, objects to collect, moving the character with the keyboard etc.	C.S.
Spring 2	**Programming Robots- Lego** ● design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts ● use sequence, selection, and repetition in programs; work with variables and various forms of input and output ● use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs ● select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.	C.S.

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	Programming Technic Lego robots. Building, programming and debugging to make the robot achieve different tasks. Once the children have had the opportunity to experiment and achieve the tasks they can modify the robots to achieve their own objectives. NXT	
Summer 1	**Manipulating Images** ● Select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information. Linked to the Middle School Transition Literacy Unit- Monsters Children use Sculptris to create their monster selves as a 3D image. They learn to use many tools to digitally manipulate a sphere of digital clay. They then give it texture and paint it. Following on from this stage, in the next unit, children add sound and create a presentation using Photostory. Monster Database- 2Invesigate	I.T.
Summer 2	**Digital Literacy- Sound** ● Editing, select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information. Linked to the Middle School Transition Literacy Unit- Monsters In this unit, children build up to writing diary entries about their first day at Middle School.	D.L.

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	(Monster Middle School, inspired by Monster's University.) Children write and rehearse their diary entries then record and edit their digital sound files using Audacity. They then use Sculptris to create a 3D representation of their Monster selves. They then use Photostory to combine the recorded sound and 3D pictures to create a presentation.	