



Scheme of Work

For

COMPUTING

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing 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.

INTRODUCTION TO THE SCHEME OF WORK

The purposes of the school's computing provision are to be developed through the pupils' own experiences at EYFS, a planned programme of computing skills learning and focused tasks throughout KS1 and 2, and opportunities to extend and develop these skills through application across the wider curriculum.

Working with this scheme, the overall aim is to inspire children with the enormous potential of computing skills, information technology and digital literacy. Developing a child's motivation by using computing to change the way they are able to learn and communicate is vital their success now and in the future. Being able to apply computing skills to problem solving situations is vital to the child's knowledge of the modern world. Therefore, developing a strong skills base whilst building a child's digital literacy is fundamental to the successful implementation of the scheme of work.

The long term planning for the Early Years Foundation Stage, Key Stage 1 and Key Stage 2 are set out alongside key language and skills acquisition. The school follows the original QCA scheme of work, adapted and modified to suit the needs of the pupils.

During the Early Years Foundation Stage pupils are given opportunities for the use of computers and technological devices to develop skills across the areas of learning. They are encouraged to observe and talk about the use of these tools in the environment and to show each other how to use computers and other technological equipment.

Information Technology	Computing	Digital Literacy	KEY LANGUAGE
<ul style="list-style-type: none"> Provide opportunities for children to use a range of devices such as cameras, mobile devices, audio recording devices Model and enable the use of real and imaginary technologies, including online tools Enable children interact with computer systems using different inputs – e.g. by using a mouse, voice, speech or touch Ask the children to use a keyboard to copy or write a title or caption for work Discuss how technology is used at school and at home Encourage children to operate devices and equipment in school, sometimes with adult support Tour the school photographing the various ICT equipment Encourage children to speculate about why things happen or how things work Model how to and support the saving and retrieval of children's work 	<ul style="list-style-type: none"> Ask the children to 'program' each other to find hidden objects (programming) Play Simon Says (algorithms/debugging) Ask the children to come up with a set of instructions (pictures of arrows) to navigate a partner around a simple obstacle course in PE (algorithms) Take a simple 'problem' and split it into smaller steps – e.g. to dress a teddy (computational thinking - decomposition) Record instructions for friends (programming) Listen to and follow recorded instructions Explore playing with programmable toys (e.g. Beebots, remote controlled cars etc.) (programming) Use simple software applications to make something happen (e.g. BeeBot iPad app) Draw or give simple instructions to a partner to build a simple structure using building blocks (programming) Look at a set of drawn instructions (e.g. arrows) and predict what will happen if they were entered into a programmable toy (predicting algorithms) Encourage the children to understand that operations can be predicted and have a cause and effect (e.g. press a button turns on/off) Encourage the children to develop an understanding that an operation has a predictable result (e.g. clicking a mouse selects an object) (predicting algorithms) Ask the children to sequence a series of photographs to recount a story (algorithms) Invite the children to point out simple errors in images or texts (debugging) If you have them, show the children the cables that connect computers to the school network (networks) 	<ul style="list-style-type: none"> Provide opportunities for children to explore a range of computer applications, e.g. drawing apps, age-appropriate games etc., Follow shortcuts, favourites or weblinks to explore simple websites Model using web pages to find things out Play with imaginary technologies in role-play Get the children to use recording devices to say something about themselves or express their ideas Listen to stories, music, watch animations using digital devices Ask the children to choose a website appropriate for an activity Ask the children to match images to a sound Supervise the children choosing appropriate images for a specific purpose (e.g. images of trains) Provide opportunities for children to share their work online (e.g. upload to a website) Use passwords to access devices Talk about the images on a website and who they belong to Use play technology (e.g. toy mobile phones) to role-play speaking nicely to one another Ask the children what they know about themselves – e.g. names and where they live Tell and discuss stories with morals and stranger danger 	<p>Computer Monitor</p> <p>Keyboard</p> <p>Mouse Mouse mat</p> <p>Headphones Speakers</p> <p>Volume</p> <p>CD ROM</p> <p>Tool bar</p> <p>Menu Program</p> <p>Drag / drop</p> <p>Control commands Video Digital camera Tape recorder</p>

Green = eSafety

By the end of the Early Years Foundation Stage most children will be able to:

- know how to operate simple equipment (30 -50 months)
- show an interest in technological toys (30 -50 months)
- show skill in making toys work by pressing parts or lifting flaps (30 -50 months)
- know that information can be retrieved from computers (30 -50 months)
- **complete a simple program on a computer (40 -60 months)**
- **use hardware to interact with age-appropriate computer software (40 -60 months)**

KS1 (YEARS 1 and 2)

Throughout KS1, pupils will build on knowledge skills, concepts and attitudes from the foundation stage, in addition:

	CS	IT	DL
1	<p>Understand what algorithms are</p> <p>Create simple programs</p>	<p>Use technology purposefully to create digital content</p> <p>Use technology purposefully to store digital content</p> <p>Use technology purposefully to retrieve digital content</p>	<p>Use technology safely</p> <p>Keep personal information private</p> <p>Recognise common uses of information technology beyond school</p>
2	<p>Understand that algorithms are implemented as programs on digital devices</p> <p>Understand that programs execute by following precise and unambiguous instructions</p> <p>Debug simple programs</p> <p>Use logical reasoning to predict the behaviour of simple programs</p>	<p>Use technology purposefully to organise digital content</p> <p>Use technology purposefully to manipulate digital content</p>	<p>Use technology respectfully</p> <p>Identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies</p>

KEY LANGUAGE

Mouse arrow pointer drag click select screen monitor.

Key keyboard spacebar enter delete print printer save

Button icon text graphics multimedia

Information key words objects

Pictogram collect sort data classify

Sequence order instruction remote control

Shift return insert backspace text wrap delete

Graphics icon pencil tool spray tool flood fill line texture 'save as'

Search CD ROM menu index Hot links hyperlinks

Floor turtle control devices instructions data commands program

During Key Stage 1 pupils explore computing/technology and learn to use it confidently and with purpose to achieve specific outcomes. They start to use computing to develop their ideas and record their creative work. They become familiar with hardware and software.

Pupils are taught the knowledge, skills and understanding through the areas of study outlined in Curriculum 2014, developed through bespoke medium term planning, supplemented by the Rising Stars 'Switched on Computing' scheme. This is delivered on an annual cycle for each year as follows:

	TERM 1	TERM 2	TERM 3	TERM 4	TERM 5	TERM 6
YEAR 1	Basic skills – mouse control and using the keyboard.	We are celebrating.	Using/understanding instructions.	Using a word bank.	Labelling and classifying.	Introduction to modelling.
YEAR 2	Writing stories.	We are zoologists – questions and answers.	Creating pictures.	Control.	Further word processing skills.	Finding information.

By the end of KS1, most children will be able to:

- recognise common uses of information technology beyond school (computers)
- use technology purposefully to create, organise, store, manipulate and retrieve digital content (using a computer)
- use technology purposefully to create digital content comparing benefits of different programs (using a computer)
- use technology safely and keep personal information private (online safety)
- use logical reasoning to predict the behaviour of simple programs (coding)
- create simple programs (coding)
- create and debug simple programs (coding)
- debug simple programs by using logical reasoning to predict the actions instructed by the code (coding)
- understand that programs execute by following precise and unambiguous instructions (coding)

Throughout KS2, pupils will build on knowledge, skills and understanding from KS1, in addition:

	CS	IT	DL
3	<ul style="list-style-type: none"> Write programs that accomplish specific goals Use sequence in programs Work with various forms of input Work with various forms of output 	<ul style="list-style-type: none"> Use search technologies effectively Use a variety of software to accomplish given goals Collect information Design and create content Present information 	<ul style="list-style-type: none"> Use technology responsibly Identify a range of ways to report concerns about content
4	<ul style="list-style-type: none"> Design programs that accomplish specific goals Design and create programs Debug programs that accomplish specific goals Use repetition in programs Control or simulate physical systems Use logical reasoning to detect and correct errors in programs Understand how computer networks can provide multiple services, such as the World Wide Web Appreciate how search results are selected 	<ul style="list-style-type: none"> Select a variety of software to accomplish given goals Select, use and combine internet services Analyse information Evaluate information Collect data Present data 	<ul style="list-style-type: none"> Understand the opportunities computer networks offer for communication Identify a range of ways to report concerns about content Recognise acceptable/unacceptable behaviour
5	<ul style="list-style-type: none"> Solve problems by decomposing them into smaller parts Use selection in programs Work with variables Use logical reasoning to explain how some simple algorithms work Use logical reasoning to detect and correct errors in algorithms Understand computer networks, including the internet Appreciate how search results are ranked 	<ul style="list-style-type: none"> Combine a variety of software to accomplish given goals Select, use and combine software on a range of digital devices Analyse data Evaluate data Design and create systems 	<ul style="list-style-type: none"> Understand the opportunities computer networks offer for collaboration Be discerning in evaluating digital content

KEY LANGUAGE

Font size, type colour highlight copy select all frame insert centre paste align left/align right graphics scale cut re-size text save as save Sequence record CD ROM sound recorder tape recorder volume Database field record file sort bar classify chart order graph data Simulations pattern
 E mail attachment address/book Font size bold copy move spell check cut and paste find and replace Cut copy paste import export undo scanner clip art digital camera
 Questionnaire pie chart line/bar graph procedure repeat penup pendown clear modelling sequence pattern LOGO Object layer And or searches filter graph chart accuracy error bias data databases spreadsheet cell formula sum calculate switch on wait switch off repeat procedure buzzers lights inputs outputs program control box instructions interactive hot spots hyperlinks attach hypertext multimedia Internet template soundtrack slide show animation recorder Spreadsheet data model if then until control box procedure light sensors pressure pads motors buzzers input devices output devices audience index bookmark URL search engine bias databases interpret

During KS2 pupils will use a wider range of computing tools and information sources to support their work in other subjects. They develop their research skills and decide what information is appropriate for their work. They begin to question the plausibility and quality of information. They learn how to amend their work and present it in a way that suits its audience.

LOWER KS2 – Year 3 and 4

Pupils will build on knowledge, skills and understanding from KS1 and, in addition, will learn how to communicate messages by using a combination of graphics and text. They will explore and develop ideas by using computers and other methods. Pupils will learn to collect and store information. They will begin to understand that computer simulations can represent real and imaginary situations. Pupils will learn to use e-mail to send and receive messages. They will learn that computers can be used to organise, reorganise, develop and explore ideas. Pupils will be able to develop visual ideas and to realise these ideas using IT. They learn to code and debug instructions to control a screen turtle.

UPPER KS2 Years 5 and 6

Pupils will build on knowledge, skills and understanding from years 3 and 4 and, in addition, will learn to use an object-based graphics package to produce images and visual models. They will learn the importance of checking information for mistakes and anomalies. Pupils will be able to enter numbers, labels and simple formulae into a spreadsheet and to use the data to calculate totals. They will learn how to control simple devices, such as buzzers, small motors and lights, using basic control boxes. Pupils will understand that devices can be connected to a computer to monitor and measure changes in environmental conditions. They will learn to create a multimedia presentation using text, images, and sounds. Pupils will learn to use large sources of information, such as those found on the Internet.

Throughout KS2, pupils are taught the knowledge, skills and understanding through the areas of study outlined in Curriculum 2014, developed through bespoke medium term planning, supplemented by the Rising Stars 'Switched on Computing' scheme. This is delivered on an annual cycle for each year as follows:

	TERM 1	TERM 2	TERM 3	TERM 4	TERM 5	TERM 6
YEAR 3	Text and graphics.	We are comic writers.	Basic Presentation / DTP skills.	Introduction to databases.	Basic internet skills.	Writing for different audiences.
YEAR 4	Further database skills.	Writing for different audiences.	Recap/further internet skills.	Basic multi-media presentation.	Online safety / Cybercafe.	Modelling effects on screen.
YEAR 5	Fun with facts.	Advanced Word processing.	Introduction to coding.	Analysing data.	Research and presentation.	Fun with images.
YEAR 6	Multi-media presentation.	Intro to coding.	Further analysis of data.	HTML and web pages.	We are publishers.	Using the internet.

By the end of KS2, most pupils will be able to:

- understand how computer networks enable computers to communicate and collaborate (networks)
- begin to use internet services within his/her own creation to share and transfer data to a third party (networks)
- independently select, use and combine a variety of software to design and create content for a given audience (using a computer)
- design and create a range of programs, systems and content for a given audience (using a computer)
- independently select, use and combine a variety of software to collect, analyse, evaluate and present data and information (using a computer)
- use technology respectfully and responsibly (online safety)
- identify a range of ways to report concerns about content and contact in and out of school (online safety)
- be discerning when evaluating digital content (net searching)
- use filters in search technologies effectively (net searching)
- include use of sequences, selection and repetition with the hardware used to explore real world systems (coding)
- solve problems by decomposing them into smaller parts (coding)
- create programs which include variables (coding)
- use variables, sequence, selection and repetition in programs (coding)
- use logical reasoning to explain how increasingly complex algorithms work to detect and correct errors in algorithms and programs efficiently (coding)

Promoting pupils' spiritual, moral, social and cultural development through computing

Our computing curriculum will provide opportunities to promote:

- ❖ *Spiritual development*, through helping pupils to discuss how the limitations of computers and technological devices make us more aware of what makes us human and helping pupils to recognise their own, and others' creativity and imagination
- ❖ *Moral development*, through considering some of the ethical issues surrounding the misuse of information and consequently appreciating the need for greater responsibility in its use
- ❖ *Social development*, through considering how computers and IT can facilitate communication and the sharing of information and discussing how computing and IT affect ways of life, ways of working and communities
- ❖ *Cultural development*, through discussing how information arises out of a cultural context, discussing how IT connects local, national and international communities, and through learning about other cultures through information on the Internet.

Promoting key skills through computing

Computing provides opportunities for pupils to develop the key skills of:

- ❖ *Communication*, through reading and selecting from a range of sources, planning, writing and refining texts in different styles and for different purposes, communicating face-to-face and by e-mail, and discussing and reflecting critically on their own and on others' work.
- ❖ *Application of number*, through working with quantitative data and mathematical models
- ❖ *Working with others*, through discussing and reflecting critically on their own and others' work, developing information systems as part of a group, and working with others via e-mail and the internet
- ❖ *Improving own learning and performance, through reviewing*, modifying and evaluating their work as it progresses
- ❖ *Problem solving*, through modelling real situations and developing solutions to problems when working with technology

Promoting other aspects of the curriculum

Computing will provide opportunities to promote:

- ❖ *Thinking skills*, through helping pupils identify relevant sources of information, develop ideas and work collaboratively to solve problems
- ❖ *Enterprise and entrepreneurial skills*, through encouraging pupils to design and implement solutions to real problems
- ❖ *Education for sustainable development*, through developing pupils' understanding of the implications of IT for working life, society and the environment.

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