Computing

Government Guidelines

Computing is a statutory part of the National Curriculum and the purpose of study that all schools have to adhere to are:

"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."

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 problem
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems

Taken from the 2014 National Curriculum

Intent

In line with the National Curriculum for Computing, our aim is to provide a high-quality computing education which will arouse pupils' **curiosity** and equip them to use computational thinking and **communication** to understand the world making them **global citizens**. The curriculum will teach children key knowledge about how computers and computer systems work, and how they are designed and programmed. Learners will have the opportunity to gain an understanding of computational systems of all kinds, whether or not they include computers. By the time they leave Richard Avenue, children will have gained key knowledge and skills in the three main areas of the computing curriculum: computer science (programming and understanding how digital systems work), information technology (using computer systems to store, retrieve and send information) and digital literacy (evaluating digital content and using technology safely and respectfully). The objectives within each strand support the development of learning across the key stages.

Implementation

At Richard Avenue, computing is taught using a unit approach. This ensures children are able to develop depth in their knowledge and skills over the duration of each of their computing topics. Teachers use the 'Switched On: Computing' scheme, published by Rising Stars, as a starting point for the planning of their computing lessons, which are often richly linked to engaging contexts in other subjects and topics. We have a computing suite and four sets of laptops and iPads to ensure that all year groups have the opportunity to use a range of devices and programs for many purposes across the wider curriculum, as well as in discrete computing lessons. Employing cross-curricular links that involve the **local community**, motivates pupils and supports them to make connections and remember the steps they have been taught. The implementation of the curriculum also ensures a balanced coverage of computer science, information technology and digital literacy. The children will have experiences of all three strands in each year group, but the subject knowledge imparted becomes increasingly specific and in depth, with more complex skills being taught, thus ensuring that learning is built upon. For example, children in Key Stage 1 learn what algorithms are, which leads them to the design stage of programming in Key Stage 2, where they design, write and debug programs, explaining the thinking behind their algorithms.

Impact

Our approach to the curriculum results in a fun, engaging, and high-quality computing education. The quality of children's learning is evident on the various forms of media we use at Richard Avenue to help the children to share their work across the **community**. Evidence such as this is used to feed into teachers' future planning, and as a topic-based approach continues to be developed, teachers are able to revisit misconceptions and knowledge gaps in computing through various forms of **communication**. This supports a varied pace of learning and ensures all pupils make good progress. Much of the subject-specific knowledge developed in our computing lessons is designed to arouse the **curiosity** within pupils which will benefit them in secondary school, further education and future workplaces. From research methods, use of presentation and creative tools and critical thinking, computing at Richard Avenue gives children the building blocks that enables them to pursue a wide range of interests and vocations and become **global citizens**.

Richard Avenue Primary School

Long Term Plan – Computing

	AUTUMN	SPRING	SUMMER
Year 1	We are painters How to use email safely. We are celebrating How to search the internet safely. (Leaflet – Search Engines)	We are treasure hunters Gaining consent before filming and picture taking. We are storytellers Recognise and understand copyright.	We are collectors How to search the internet safely. We are TV chefs Recognise and understand copyright.
Year 2	We are astronauts How to report inappropriate material. We are researchers How to search the internet safely.	We are photographers What makes an image acceptable or unacceptable. We are detectives How to safely use email.	We are zoologists Keeping personal information private. We are games testers Understanding PEGI age restrictions.
Year 3	We are programmers Recognise and understand copyright. (Leaflet – Esafety Info) We are communicators How to safely use email.	We are bug fixers What is acceptable behaviour online? We are opinion pollsters Keeping personal information private.	We are presenters What makes an image acceptable or unacceptable. We are network engineers What is a digital footprint?
Year 4	We are co-authors How to report inappropriate material. We are musicians Recognise and understand copyright.	We are HTML editors What is acceptable behaviour online? We are meteorologists What makes an image acceptable or unacceptable.	We are toy designers How to search the internet safely. We are software developers What is acceptable behaviour online? (Leaflet – Online Gaming)
Year 5	We are cryptographers How to make sure personal information is kept secure. We are web developers How to safely use search engines.	We are game developers How to search the internet safely. (Leaflet – Search Engines) We are artists How to evaluate online content.	We are bloggers What is acceptable behaviour online? We are architects Recognise and understand copyright.
Year 6	We are app planners How to use search engines in a safe manner. We are project managers Recognise and understand copyright.	We are market researchers The use of anonymity and confidentiality. We are interface designers Respecting copyright conditions.	We are app developers Safe and responsible use of online communities. (Leaflet – Social Media) We are marketers Keeping personal information private.

	Year 1	Year 2	Year 3/4	Year 4/5	Year 5/6
Text and multimedia	Work with others and with support to contribute to a digital class resource which includes text, graphic and sound.	Generate their own work, (with help where appropriate with multimedia) combining text, graphics and sound. Save and retrieve and edit their work.	Record and present information integrating a range of appropriate media combining text and graphics in printable form and sound and video for on-screen presentations which include hyperlinks. Begin to show an awareness of the intended audience and seek feed-back.	Use advanced tools in word processing / DTP software such as tabs, appropriate text formatting, line spacing etc appropriately to create quality presentations appropriate for a known audience.	Multimedia work shows restrained use of effects that help to convey meaning rather than impress
Digital images (photos, paint, animation)	Use a range of simple tools in a paint package / image manipulation software to create / modify a picture.	Use a range of tools in a paint package / image manipulation software to create / modify a picture to communicate an idea. Create a simple animation to tell a story.	Manipulate digital images using a range of tools in appropriate software to convey a specific mood or idea.	Make a short film / animation from images (still and / or moving) that they have sourced, captured or created.	Use images that they have sourced /captured / manipulated as part of a bigger project (eg presentation or document)
Sound and music (inc sound recorders)	Chose suitable sounds from a bank to express their ideas. Record short speech.	Compose music from icons. Produce a simple presentation incorporating sounds the children have captured, or created.	Create a simple podcast, selecting and importing already existing music and sound effects as well as recording their own.	Create multiple track compositions that contain a variety of sounds.	Create and share more sophisticated podcasts and consider the effect that their podcasts will have on the audience.
Electronic communication	Contribute ideas to a class email to another class / school etc.	Work collaboratively by email to share and request information of another class or story character.	Begin to understand the need to abide by school e-safety rules	Share ICT work they have done electronically by email, VLE, or uploading to authorised sites. Where possible seek and respond to feedback.	Abide by school rules for e-Safety.

Research and eSafety	As a class exercise children explore information from a variety of sources (electronic, paper based, observations of the world around them, etc.). They show an awareness of different forms of information	Children use a search engine to find specific relevant information to use in a presentation for a topic. They save and retrieve their work.	Using another curriculum area as a starting point, children ask their own questions then use ICT sources to find answers, making use of search engines, an index, menu, hyperlinks as appropriate. Children use the information or resources they have found. Children talk about using ICT to find information / resources noting any frustrations and showing an emerging understanding of internet safety.	Make use of copy and paste, beginning to understand the purpose of copyright regulations and the need to repurpose information for a particular audience. They show an understanding that not all information on the internet is accurate. Develop a growing awareness of how to stay safe when using the internet (in school and at home) and that they abide by the school's internet safety policy	Independently and with due regard for safety, search the internet using a variety of techniques to find a range of information and resources on a specific topic. Use appropriate methods to validate information and check for bias and accuracy. Repurpose and make appropriate use of selected resources for a given audiences, acknowledging material used where appropriate.
Control (algorithms)	Control simple everyday devices to make them produce different outcomes.	Control a device, on and off screen, making predictions about the effect their programming will have. Children can plan ahead.	Children are able to type a short sequence of instructions and to plan ahead when programming devices on and off screen.	Engage in Logo based problem solving activities that require children to write procedures etc. and to predict, test and modify. Use control software to control devices (using output commands) or to simulate this on screen. Predict, test and refine their programming.	Independently create sequences of commands to control devices in response to sensing (i.e. use inputs as well as outputs). Design, build, test, evaluate and modify the system; ensuring that it is fit for purpose.

Handling information (databases and graphs)	As a class or individually with support, children use a simple pictogram or painting program to develop simple graphical awareness / one to one correspondence.	Use a graphing package to collect, organise and classify data, selecting appropriate tools to create a graph and answer questions. Enter information into a simple branching database, database or word processor and use it to answer questions. They save, retrieve and edit their work.	Children use a simple database (the structure of which has been set up for them) to enter and save and save information on a given subject. They follow straight forward lines of enquiry to search their data for their own purposes. They talk about their experiences of using ICT to process data compared with other methods.	Children work as a class or group to create a data collection sheet and use it to setup a straight forward database to answer questions. Enter information and interrogate it (by searching, sorting, graphing etc). Begin to reflect on how useful the collected data and their interrogation was and whether or not their questions were answered	Independently solve a problem by planning and carrying out data collection, by organising and analysing data involving complex searches using a database, and by drawing conclusions and presenting findings. The need for accuracy is demonstrated and strategies for spotting implausible data are evident. Children should be able to talk about issues relating to data protection and the need for data security in the world at large (eg health, police databases)
Modelling and simulations (spreadsheets, adventure games and simulations)	Make simple choices to control a simple simulation program.	Children are able to play an adventure game and use a simple simulation, making choices and observing the results. Their conversation shows they understand that computers are good at replicating real life events and allowing them to explore contexts that are otherwise not possible.	Use models and simulations to find things out and solve problems. Recognise that simulations are useful in widening experience beyond the classroom. Make simple use of a spreadsheet to store data and produce graphs	Set up and use a spreadsheet model to explore patterns and relationships. Make predictions. Know how to enter simple formulae to assist this process	Set up and use their own spreadsheet which contains formulae to investigate mathematical models. Ask "what if …" questions and change variable in their model. Understand the need for accuracy when creating formulae and check regularly for mistakes, by questioning results. Relate their use of spreadsheets to model situations to the wider world.

Data logging (science and maths)			Begin to use a data logger to sense physical data (sound, light, temperature).	Use a data logger confidently, connected to the computer or remotely, to capture continuous or intermittent data readings. Interpret the results and use these in their investigations. Realise the advantages of using ICT to collect data that might otherwise be problematic.	Children are able to identify their own opportunities for data logging and carry out their own experiments. They check and question results and are able to spot trends in data and identify when problems may have occurred.
Understanding Technologies (individual technologies)	Show an awareness of the range of devices and tools they encounter in everyday life.	Show an awareness of a range of inputs to a computer (IWB, mouse touch screen, microphone, keyboard, etc)	Begin to show discernment in their use of computing devices and tools for a particular purpose and explain why their choice was made.	Make choices about the devices and tools they use for specific purposes and explain them in relation to the context. Begin to show an awareness of specific tools used in working life.	Evaluate the tools available to them including any that are unfamiliar or new and use them to solve problems. Demonstrate an awareness of the appropriateness of outcomes depending on choices regarding tools and devices.
Understanding Technologies (networks)	Show an awareness that what they create on a computer or tablet device can be shown to others via another device (e.g. printer, projector, Apple TV)	Begin to show an awareness that computers can be linked to share resources.	Show an understanding that their password is the key to accessing a personalised set of resources and files (e.g. My Documents). Show an awareness of where passwords are critical in everyday use (e.g. parents accessing bank details)	Show an understanding of the school network and how it links computers to resources in school and beyond. Compare this with other networks they may encounter at home or in the wider world (e.g. banks).	Show an understanding of how filtering and monitoring tools affect their use of the school network and Internet and compare this with their experience of access outside school.

Understanding Technologies (the internet)		Use websites and demonstrate an awareness of how to manage their journey around them (e.g. using the back/forward button, hyperlinks).	Show an awareness that not all the resources/tools they use are resident on the device they are using. Begin to show an understanding of URLs.	Perform a search using different search engines and check the results against each other, explaining why they might be different. Show an awareness of the need for accuracy in spelling and syntax to search effectively.	Use collaborative tools and e-mail showing a sensitivity for this type of remote collaboration and communication.