Curriculum: Computing

Deepcar St. John's C.E. Junior School

- Vision
- Intent, Implementation & Impact
- National Curriculum
- Overview of learning
- Progression

Vision

At Deepcar St John's C of E Junior School, we believe that computing is an essential part of the curriculum. In the 21st century, Computing is a significant and integral aspect of everyone's daily life and children should be at the forefront of new technology. In a world where technology is rapidly advancing, it is important that children leave Deepcar St John's digitally literate in order to succeed and flourish. They should leave with confidence, possessing a range of fundamental and transferrable skills to equip them for the rest of their life.

Intent

Whilst at Deepcar St Johns, children will develop and be able to apply their knowledge of the three main content areas:

- Computer Science
- Information Technology
- Digital Literacy
-

Computer Science

Children will have a rich knowledge of computer science, understanding concepts such as algorithms and programming. They will have the foundational knowledge to understand and interpret other areas. All children, in every year group, have opportunities to use computational thinking (CT) and solve problems.

Information Technology

Children will have opportunities to understand the context of computers in society in different sectors and understand the methods used to create digital artefacts. Children will be confident in in using a range of applications to create different digital artefacts, their knowledge underpinning these skills. Children will also understand the profound impact computers have had on humanity.

Digital Literacy

When children leave school, they will have the skills needed to be an effective and safe user. The knowledge possessed by pupils is not assumed by teachers and we strive to ensure all children are able to safely and confidently navigate computing devices.

Key Core Concepts

1		To connect – Children will understand advantages and risks posed by online communications and understand how they operate. Children will understand how to act safely and appropriately online.
2		To communicate – Children will be able to use a range of programs to communicate (such as Microsoft Word, PowerPoint, Publisher and Excel), using their advanced features to create high quality products.
3		To collect – Children will use, select, devise and contruct databases to record information presenting it in a professional and effective manner.

4	To code – Children will use Scratch and Crumble to create and debug algorithms with increasing difficulty. Children will be able to use sensors and variable to control and manipulate coding.

Implementation

Technology is an everyday part of our children's learning and understanding of the world.
We will build on the Key Stage 1 work on algorithms and how they are implemented as programs on digital devices and make cross-curricular links where appropriate such as science, theme and DT to enhance learning.

Children will be taught to create and debug simple programs and use logical reasoning to predict the behaviour of simple programs. We teach in semantic waves using unplugged activities to help embed knowledge enabling novices to develop expert knowledge overtime. We use unplugged activities which allow us to introduce and again embed computing concepts. We incorporate faded worked examples, where steps are removed allowing children to use their problem-solving skills. These learning experiences will increase in complexity through the school up to Y6.

In Key Stage 2 the children will design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. They will use sequence, selection, and repetition in programs, use logical reasoning to explain how some simple algorithms work and correct errors in algorithms and programs.
Children will be taught to understand computer networks, including the internet, and the opportunities they offer for communication and collaboration. They will use search technologies effectively, learn to appreciate how results are selected and ranked, and be discerning in evaluating digital content.
Children will be taught to select, use and combine a variety of software (including internet services) on a range of digital devices to create a range of programs, systems and content that accomplish given goals.

Computer science
To ensure children have the foundational knowledge needed to succeed in Computing, as a school we are clear on the programming language we use. This vocabulary is built on as children progress through school, ensuring they understand key terms and can use this language confidently. In lessons, children are encouraged to build 'mental models' of what a program will do when run by analysing and predicting code.

Information technology
Children will be shown how to use a range of technology purposefully to create, organise, store, manipulate and retrieve digital content. Children will create a range of digital artefacts during their time at Deepcar St Johns such as: spreadsheets, posters, multimedia stories and radio adverts. When creating, children carefully consider the design, usability and trustworthiness of their artefact. Through creating a range of digital content, children become aware of how computing is used purposefully and its contexts beyond school, allowing children to link knowledge and create meaning. Where fitting, links are also made to the impact computers have had on humanity. This is further explored in assemblies through the year.

Digital literacy
Our units provide children with the skills and knowledge required to be an **effective, safe** and **discerning** user of computers. Teachers do not make assumptions about pupils' prior knowledge within digital literacy; they consider pupils' levels of expertise when deciding teaching approaches. We tailor our teaching to the needs of our learners. We have found that, likely due to the increase in tablet use, many children are lacking many key technology skills required for the workplace. To enhance these skills, we have planned in the use of technology into foundation subjects to help develop these skills and better prepare our learners for later life.

They will be taught to understand the effect of their digital footprint and to use technology safely, respectfully and responsibly. The curriculum sequences knowledge related to e-safety to ensure content is age-appropriate. They will understand the need for keeping personal information private

and recognise acceptable/unacceptable behaviour; identify where to go for help, support and reporting when they have concerns about content or contact on the internet or other online technologies.

Schemes
We use Sheffield Primary Computing scheme of work to guide our computing curriculum which is also supplemented by other high-quality resources to enhance learning such as Teach Computing modules. Staff receive up to date training to support their professional development and confidence in teaching. An external provider offers an after-school computing club to all year groups to help promote an enthusiasm and interest in Computing from an early age, building skills to take their technology knowledge further.

Sequencing and pedagogy
The sequencing of our content is carefully considered. Declarative and procedural knowledge is identified and sequenced to allow children to successfully embed complex ideas and processes. An example of this is the use of unplugged activities. As mentioned previously, our programming language is clear and is built on as children progress through year groups. As a school, we understand that it is not possible to teach all computing knowledge and have therefore selected the 'key knowledge', that we feel is the most important to set a strong foundation to learn from. To help children understand abstract, complex concepts, teaching is sequenced in 'semantic waves', whereby teachers link concepts to simple examples through the use of unplugged activities, metaphors and worked and faded worked examples. This in turn helps to decrease the pupil's cognitive load.

To help with the implementation of the computing curriculum, we have a variety of hardware:
- 72 iPads
- 20 sets of Crumble
- 45 Microbits
- A computing suite

Impact

Children will leave St John's digitally literate and able to join the rest of the world on its digital platform. They will be equipped, not only with the skills and knowledge to use technology effectively and for their own benefit, but more importantly – safely. The biggest impact we want on our children is that they understand the consequences of using the internet and that they are also aware of how to keep themselves safe online.
As children become more confident in their abilities in Computing, they will become more independent and key life skills such as problem-solving, logical thinking and self-evaluation become second nature. We measure the impact of our curriculum through:
- Termly assessments (multiple choice quizzes to assess knowledge, teacher assessment and finished work to assess skills).
- Pupil voice
- Pupils using and applying their knowledge of computing to other areas of the curriculum.

National Curriculum

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.

Pupils should be taught to:

- 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.
- 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.
- Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Overview of learning

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 3	**Unit 1.3** What makes a good poster? Word, text and graphics To communicate		**Unit 3.3** How do we use databases to find out information? Excel To collect		**Unit 4.3 & 5.3 (PR3)** How do I use repetition and loops in programs? Logo and Scratch To code	
Year 4	**Unit 1.4** How do I use a computer as an artist? Paint, graphics To communicate		**Unit 2.4** What makes an excellent multimedia story? PowerPoint / iMovie To connect		**Unit 4.4 & 5.4 (PR4)** How do I write efficient programs using selection? Scratch To code	
Year 5	**Unit 3.5 & 1.5** How do I search safely and effectively collaborate online? PowerPoint To communicate		**Teach Computing** How do I programme physical systems? Microbits To code		**Unit 2.5** How do I create a radio advert? Audacity To connect	
Year 6	**Unit 3.6** Why do we use spreadsheets? Excel To collect		**Teach Computing** How are variables used in games? Scratch To code		**Teach Computing** How do I build a physical system and program complex programmes? Crumble To code	

Subject Progression

Declarative knowledge

	To code	To connect	To collect	To communicate
Y3	Children can identify blocks on Scratch. Children understand what is meant by algorithm and sequence. Children can recall programming language from Scratch. Children understand the terms repetition and count-controlled loops, and that they make a program more efficient.		Children understand the advantages of using databases on a computer. Children understand key database vocabulary (record, field and search). Children understand that our personal information belongs to us and when to share personal information and when not to. Children understand the importance of the questions asked when gathering data	Children understand what makes a good poster. (E.g. appropriate font size) Children understand tha you need to ask permission to use a photo of other people. Children understand where to find copyright-free images.
Y4	Children understand what decomposition is. Children understand what selection is. Children understand what forever loops are.	Children understand what makes a good multimedia story. Children understand how some features can enhance a story.		Children understand why we use computers to create art.
Y5	Children understand the terms input, output and sensor, and can give examples of each. Children know what is meant by selection.	Children know at least 3 features of a good radio advert. Children know that Audacity is an audio editing software that is free to use.		Children know the difference between the world wide web and the internet. Children understand that additional words can improve their searches and understand how webpage results are ranked on search engines with usually, the most relevant being at the top. Children know a range of internet services and the pros and cons of them.

				Children understand that anyone can post information on the world wide web Children know how the responsible use of personal information Children understand what makes a good webpage (e.g. title, subheadings, font size, colours, hyperlinks, images) Children understand the key features of Microsoft PowerPoint to help them create a webpage
Y6	Children understand what is meant by the term variable. Children know that variables hold letters or numbers Children understand that a condition being met can start an action		Children understand the uses of a spreadsheet. Children understand the terms: mean, medium, mode and range. Children understand that poor data can lead to unreliable results.	

Procedural knowledge

	To code 	To connect 	To collect 	To communicate 
Y3	Children can predict what blocks and different code will do. Children can make a sprite move in different directions. Children can put blocks in the correct order. Children can add backgrounds and additional sprites and can change the colour of a sprite. Children can plan out a program that uses 3 different Events on one sprite to make something happen. Children can plan and create an algorithm to draw a shape. Children can use forever loops and count-controlled loops.		Children can navigate a simple database using sort and search tools. Children can design a questionnaire with appropriate questions together data. Children can enter their data into a database. Children can create a graph. Children can draw conclusions from their data.	Children can add Word Art and text boxes. Children can edit the text changing the size, font, colour and underlining/bold if they choose to. Children can open and save their work into a folder. Children can copy and paste, and resave images. Children can choose suitable images for their poster. Children can consider the success criteria when choosing the size, font, colour, images, etc for their poster. Children can review and edit work according to the success criteria and feedback from a peer.
Y4	Children can explore code. Children can complete algorithms for events. Children can create an algorithm that includes a forever loop. Children can use x and y blocks. Children can use selection (if… when…) Children can debug code.	Children can collect suitable images for their story. Children can sequence images. Children can add titles. Children can add sound effects, music and/or narration. Children can add transitions. Children can add the above features in a way that enhances the story. Children can evaluate their peers' multimedia stories and explain their ratings.		Children can sketch and repeat an idea. Children can use a range of features on Microsoft paint to recreate a picture/style. Children can use a range of features on Microsoft Paint to communicate their ideas professionally. Children can create a repeated pattern. Children can evaluate their finished piece.

Y5	Children can program an output (LED) to display an image and their name. Children can create an animation of at least 3 frames, using the Microbit. Children can create a program where an input controls an output, planning beforehand and evaluating after. Children can predict, discuss, create and debug code relating to selection. Children can plan out their own program, using at least 2 different inputs and 3 icons. Children can write their own algorithm, test it and evaluate. Children can create a program using selection, to test electrical conductivity.	Children are able to use a device to record their voice, considering the success criteria (e.g. clear voice). Children are able to add effects to their voice and can add in sound effects and music. Children can adjust the volume of their audio recording, sound effects and music. Children can trim, move and delete clips. Children know how to find copyright free sound effects and music.		Children can assess the reliability of online content. Children can create webpage with a range of features considering how best to present their information. Children can add a hyperlink to other relevant information
Y6	Children can design a conditional loop Children can program a microcontroller to respond to an input Children can use selection (an 'if…then…' statement) to direct the flow of a program Children can test and debug my project Children can use selection to produce an intended outcome Children can create a detailed drawing of my project Children can describe what my project will do Children can write an algorithm that describes what my model will do Children can explain that a condition is either true or false Children can relate real-world experiences of variables to a simple project in Scratch, identifying what changes and how it changes Children can design and code a simple project		Children can answer questions about data. Children can use simple operations in a formula for a specific purpose. Children can copy and paste. Children can fill down a set of cells to work efficiently. Children can create a formula to solve a specific calculation. Children can create a spreadsheet for a specific purpose. Children can calculate totals and amounts remaining.	

	including a variable for 'score' Children can identify the name and value of a variable and that variables can only hold one value at a time Children can choose suitable names for variables Children can create and change variables in a Scratch project			

To see progression of computer skills and digital literacy see: Sheffield Primary Computing Progression Framework: https://sheffieldclc.net/wp-content/uploads/2021/10/Sheffield-Primary-Computing-Progression-Framework.pdf