# Computing: Key Knowledge and Skills Progression Overview

Computing Curriculum Intent:

Utilising *Switched on Computing* at The Radstone Primary School, we will provide full coverage of the primary computing programmes of study. By delivering a coherent, complete and high-quality computing curriculum that helps children progress their knowledge, understand and skills within computing, we will allow all children at The Radstone to access modern technology in a fast-paced digital era. Through the computing programme of study, children will create digital artefacts that will provide excellent evidence of their developing skills. The whole-school approach to keeping an online portfolio of each child's work in computing will clearly demonstrate their achievements from one year to the next. Children at The Radstone have the opportunity to make a digital difference on the world.

Computing Key Concepts

| | |
|---|---|
| **Computer Science** | The numerous process that interacts with different sources of data and information that can be represented in the form of apps, games, software or programs. |
| **Information Technology** | The use of any computers, storage, networking and other physical devices to create, progress, store and exchange any form of digital data. |
| **Digital Literacy** | The ability to find, evaluate, utilize, share and create content using resources including eBooks, websites, social media and videos. |

| | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Year 1 | We are Treasure Hunters | We are TV Chefs | We are Digital Artists | We are Publishers | We are Rhythmic | We are Detectives |
| Year 2 | We are Astronauts | We are Game Testers | We are Photographers | We are Safe Researchers | We are Animators | We are Zoologists |
| Year 3 | We are Programmers | We are Bug Fixers | We are Presenters | We are who we are | We are Co-Authors | We are Opinion Pollsters |

| | | | | | | |
|---|---|---|---|---|---|---|
| Year 4 | We are Software Developers | We are Makers | We are Musicians | We are Bloggers | We are Artists | We are Meteorologists |
| Year 5 | We are Game Developers | | We are Architects | | We are Adventure Gamers | |
| Year 6 | We are Toy Makers | We are Computational Thinkers | We are Publishers | We are Connected | We are Advertisers | We are AI Developers |

| Knowledge Progression | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|---|---|---|---|---|---|---|
| **Computer Science** | To understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions. To create and debug simple programs. To use logical reasoning to predict the behaviour of simple programs. | | To design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts. To 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 to detect and correct errors in algorithms and programs. To 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. | | | |
| | 1.1.1. Know that programmable robots can be controlled by inputting a sequence of instructions.<br><br>1.1.2. Develop and record sequences of instructions as an algorithm.<br><br>1.1.3. Be able to program a robot to follow their algorithm.<br><br>1.1.4. To debug and predict different programs.<br><br>1.1.5. Be able to break down a process into simple, clear steps. | 1.2.1. Plan a sequence of instructions to move sprites in ScratchJr.<br><br>1.2.2. Create, test and debug programs for sprites in ScratchJr.<br><br>1.2.3. Work with input and output in ScratchJr.<br><br>1.2.4. Use repetition in their programs.<br><br>1.2.5. Observe and describe carefully what happens in computer games.<br><br>1.2.6. Use logical reasoning to make predication of what | 1.3.1. Plan and create an algorithm for an animated scene in the form of a storyboard.<br><br>1.3.2. Write a program in Scratch to create an animation, including characters, dialogues, costumes, backdrops and sound.<br><br>1.3.3. Recognise the importance of user interface design, including considerations of input and output. | 1.4.1. Develop an education computer game using selection and repetition. Understand and use variables.<br><br>1.4.2. Start to debug computer programs.<br><br>1.4.3. Recognise the importance of user interface design, including consideration of input and output.<br><br>1.4.4. Learn about the input – process – output model of computation. | 1.5.1. Design and create a computer program for a computer game, which uses sequence, selection, repetition and variables.<br><br>1.5.2. Detect and correct errors in their computer games.<br><br>1.5.3. Be familiar with semaphore and Morse code.<br><br>1.5.4. Name and function the components making up the school's network.<br><br>1.5.5. Understand how information is passed | 1.6.1. Understand how computers use stored programs to connect input and output.<br><br>1.6.2. Generate and evaluate designs in response to a brief.<br>.<br>1.6.3. Plan a complex project by decomposing it into smaller parts.<br><br>1.6.4. Work with physical components of a system or network<br><br>1.6.5 Develop the ability to reason logically about |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 1.1.6. To program sprites to playback recorded audio in ScratchJr.<br><br>1.1.7. To program ScratchJr to create repeating rhythms using recorded audio. | a program will do and test these predictions.<br><br>1.2.7. Think critically about computer games and their use.<br><br>1.2.8. Create sequences of instructions for a virtual robot to solve. | | 1.4.5. Understand the inputs and outputs available on a BBC micro:bit.<br><br>1.4.6. Program using MakeCode block-based environment.<br><br>1.4.7. Test and debug programs they write, using an on-screen simulator and the micro:bit. | between the components that make up the Internet. | algorithms. ·<br><br>1.6.6. Understand how some key algorithms can be expressed as programs.<br><br>1.6.7. Understand that some algorithms are more efficient than others for the same problem.<br><br>1.6.8 Understand common algorithms for searching and sorting a list. |
| **Information Technology** | To use technology purposefully to organise, store and retrieve digital content. | | To search technologies effectively, appreciate how results are selected and ranks, and be discerning in evaluating digital content. To select, use and combine a variety of software 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. | | | |
| | 2.1.1. To use different features of a video camera.<br><br>2.1.2. To use a video camera to capture moving images.<br><br>2.1.3. To edit a video to include audio commentary.<br><br>2.1.4. Know how to select and set brushes and colours.<br><br>2.1.5. To create artwork in a range of styles on iPads.<br><br>2.1.6. To use the undo function if they make mistakes, and to encourage experimentation.<br><br>2.1.7. To use multiple layers in their art. | 2.2.1. Use the iPad camera app,<br><br>2.2.2. Take digital photographs<br><br>2.2.3. Review, reject or pick the images they take.<br><br>2.2.4. Edit and enhance their photographs.<br><br>2.2.5. Understand how animation works,<br><br>2.2.6 Use storyboards to plan an animation,<br><br>2.2.7. Create their own original characters, props and backgrounds for animation. | 2.3.1. Develop a number of strategies for finding errors in programs.<br><br>2.3.2. Increase their knowledge and understanding of Scratch.<br><br>2.3.3. Structure, prepare and deliver a talk about a given topic or subtopic from another area in the national curriculum.<br><br>2.3.4. Record a piece to camera.<br><br>2.3.5. Edit a movie using static images and green screen footage. | 2.4.1. Create a repeating percussion rhythm.<br><br>2.4.2. Play music using virtual instruments.<br><br>2.4.3. Compose or edit tunes using piano roll tool.<br><br>2.4.4. Become familiar with blogs as a medium and a genre of writing.<br><br>2.4.5. Create a sequence of blog posts on a theme.<br>2.4.6. Incorporate additional media.<br><br>2.4.7. Comment on the posts of others. | 2.5.1. Create original artwork and sound for a game.<br><br>2.5.2. Understand the need for private information to be encrypted.<br><br>2.5.3. Encrypt and decrypt messages in simple ciphers.<br><br>2.5.4. Understand the work of architects, designers and engineers working in 3-D.<br><br>2.5.5. Develop familiarity with a simple CAD tool. | 2.6.1. Understand how search results are selected and ranks.<br><br>2.6.2. Think critically about how video is used to promote a cause. ·<br>2.6.3. Storyboard an effective advert for a cause.<br>2.6.4. Work collaboratively to shoot original footage and source additional content.<br>2.6.5 Understand how decision trees can be trained automatically to classify data.<br><br>2.6.6 How speech recognition works. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 2.1.8. To paint on top of photographs.<br><br>2.1.9. Plan a small multimedia eBook.<br><br>2.1.10. Choose and import images.<br><br>2.1.11. Record audio commentary.<br><br>2.1.12. Add and format titles and other text.<br><br>2.1.13. Record audio on an iPad.<br><br>2.1.14. Explore different effect that can be applied to audio.<br><br>2.1.15. Create a repeating percussion pattern using virtual drum machines.<br><br>2.1.16. Experiment with a range of virtual instruments.<br><br>2.1.17 Understand how data can be structured as records with fields for information.<br><br>2.1.18 Organise data in groups and subgroups.<br><br>2.1.19 Structure data as a tree.<br><br>2.1.20 Structure data as a table. | 2.2.8. Film, review and edit a stop-motion animation.<br><br>2.2.9. Record audio to accompany their animation.<br><br>2.2.10 Sort and classify a group of items by answering questions.<br><br>2.2.11 Collect data using tick charts or tally charts,<br><br>2.2.12 Take, edit and enhance photographs,<br><br>2.2.13 Use Google Sheets or Microsoft Excel to produce basic charts.<br><br>2.2.14 Record information on a digital mat. | 2.3.6. Create a number of structured presentations.<br><br>2.3.7. Narrate presentations.<br><br>2.3.8. Practice research skills.<br><br>2.3.9 Use charts to analyse and interpret data and its results.<br><br>2.3.10 Understand some elements of survey design.<br><br>2.3.11 Use the internet to facilitate data collection. | 2.4.9. Develop an appreciation of the links between geometry and art.<br><br>2.4.10. Become familiar with the tools and techniques of a vector graphics package.<br><br>2.4.11. Develop an understanding of turtle graphics.<br><br>2.4.12 Understand different measurement techniques for weather.<br><br>2.4.13 Use computer-based data logging to automate the record of some weather data.<br><br>2.4.14 Use spreadsheets to create charts.<br><br>2.4.15 Analyse data, explore inconsistencies in data and make predictions.<br><br>2.4.16 Practice using presentation and video software.<br><br>2.4.17. Record audio on GarageBand to overlay a precomposed composition. | 2.5.6. Develop spatial awareness by exploring and experimenting with a 3-D virtual environment.<br><br>2.5.7. Identify what a source code for a web page looks like and how it can be edited.<br><br>2.5.8. Plan a non-linear presentation.<br><br>2.5.9. Create text as part of a presentation.<br><br>2.5.10. Add and edit images in a presentation.<br><br>2.5.11. Use hyperlinks for navigation between slides of a presentation.<br><br>2.6.12 Explore real-world and imagined location in VR.<br><br>2.6.13 Create 360 photosphere images.<br><br>2.5.14 Link physical objects to digital content using QR codes.<br><br>2.5.15 Create their own VR space.<br><br>2.5.16 Program objects and interactions in VR. | 2.6.7 How a neural net recognises images.<br><br>2.6.8 To train a neural net to classify images.<br><br>2.6.9 To train a machine learning system to identify sentiments. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 2.1.21 Filter and search within a data table. | | | 2.4.18. To create a multi-track composition in GarageBand. | | |
| **Digital Literacy** | To recognise common uses of information technology beyond school. To 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 use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact. | | | |
| | 3.1.1 Develop collaboration skills.<br><br>3.1.2 Think carefully about protecting their privacy.<br><br>3.1.3. Respecting another person's copyright. | 3.2.1. Be aware of how to use games safely and in balance with other activities.<br><br>3.2.2. Work out strategies for playing a game well.<br><br>3.2.3. Consider the technical and artists merits of photographs.<br><br>3.2.4. Develop collaboration skills through working as part of a group.<br><br>3.2.5 Develop research skills through searching for information in the Internet.<br><br>3.2.6. Think through privacy implications of their use of search engines.<br><br>3.2.7. Be more discerning in evaluating online information.<br><br>3.2.8. Develop presentation skills through creating and delivering a short multimedia presentation. | 3.3.1 Build up resilience and strategies for problem solving.<br><br>3.3.2. Develop their research skills.<br><br>3.3.3. Consider issues of trust and privacy when sharing information.<br><br>3.3.4. Understand the conventions for collaboration online work, particularly in wikis.<br><br>3.3.5. Be aware of their responsibilities when editing another person's work.<br><br>3.3.6. Become familiar with Wikipedia including potential problems associated with its use.<br><br>3.3.7. Practice research skills.<br><br>3.3.8. Write for a target audience using wiki tool. | 3.4.1. Identifying acceptable and unacceptable representations online.<br><br>3.4.2. To be responsible for your footprint on the internet. (Bloggers)<br><br>3.4.3. To understand how to report concerns appropriately.<br><br>3.4.4. To understand how to search the internet safely.<br><br>3.4.5. Consider and be responsible for issues of trust and privacy when sharing information and reporting concerns appropriately.<br><br>3.4.6. To understand how to give appropriate feedback to peers.<br><br>3.4.7. Consider copyright issues and learn how to create, edit and upload | 3.5.1 Appreciate the need to use complex passwords and to keep them secure.<br><br>3.5.2. To be able to review their own work and give feedback to peers. | 3.6.1. Manage or contribute to large collaboration projects, facilitated using online tools.<br><br>3.6.2. Source digital media safely.<br><br>3.6.3. Appreciate rules and guidelines for a civil online discussion. ·<br><br>3.6.4. Argue their point effectively.<br><br>3.6.5. Understand how to counter someone else's argument while showing tolerance and respect.<br><br>3.6.6. Develop some strategies for dealing with online bullying.<br><br>3.6.7 To consider some ethical principles in designs AI systems. |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 3.2.9. Provide constructive critical feedback to their peers. | 3.3.9. Develop collaboration and proofreading skills.<br><br>3.3.10 Understand some ethical and legal aspects of online data collection. | photographs to improve your blog. | | |