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**A Guide to Computing**

**at Carlinghow Academy**



This document outlines the expectations of how we teach and monitor Computing at Carlinghow Academy: progression across year groups and consistency across school.

Intent

Carlinghow Academy’s curriculum is driven by the academy’s vision that all children ‘can and will succeed’.

We provide an ambitious knowledge engaged curriculum that offers exciting and meaningful learning opportunities that motivate and inspire.

The curriculum is underpinned by the National Curriculum and ensures that, at each stage of their learning journey, each child acquires a rich bank of knowledge and skills. This knowledge and these skills in all curriculum subjects are learned, practised, retrieved and remembered at every stage of their journey through school.

Our curriculum is not narrowed, we have designed an ambitious curriculum based on the knowledge of our learners that includes a high proportion of disadvantaged and SEND pupils to ensure that they are equipped with the knowledge and cultural capital they need to succeed in life. Where appropriate a bespoke and highly personalised curriculum offer is made to individual pupils.

Our cross curriculum approach is designed so that subject specific skills are taught within an exciting topic each half term and enables our children to make meaningful links and become passionate about their own learning and wellbeing. Hooks, enrichment activities and extra-curricular opportunities supplement each topic to enable our children to make connections in their learning and acquire a deep understanding. We ensure that the links we make are real, not contrived and choose areas where genuine connections between subjects occur naturally. Ensuring that the connections make sense to the children.

We are determined that every child, will have a lifelong love of reading, and will be able to comprehend and read fluently by the end of Year 6. Our curriculum is led by the high quality and diverse texts that we choose to support learning.

We have created an environment where children are motivated to learn together in a respectful, safe and trusted learning environment where individual success are celebrated.

Implementation

The curriculum is a knowledge engaged curriculum based on good quality resources.

This Computing guide explains how the computing curriculum is implemented at Carlinghow Academy.

The school has adapted the curriculum to help reflect and represent the diversity of our pupils. Creativity and teacher expertise, underpinned by high quality research informed CPD, is woven into the curriculum with specialist teachers and outside agencies working with pupils and teachers, sharing good practice and ensuring that learners learn from the best.

Impact

The impact of providing such an ambitious curriculum driven by the academy’s vision and values and taught by skilled teachers ensures that the children of Carlinghow Academy leave prepared for the next stage of their education and able to succeed in life. Knowledge, understanding and skills are secured and embedded so that children attain highly. They take pride in all that they do, always striving to do their best. They demonstrate emotional resilience and the ability to persevere when they encounter challenge. They develop a sense of self-awareness and become confident in their own abilities. They are kind, respectful and honest, demonstrate inclusive attitudes and have a sense of their role in our wider society. They have strong communication skills, both written and verbal, and listen respectfully and with tolerance to the views of others. They take risks and are emotionally resilient recognising that we make mistakes and learn from them. They dream big and have high aspirations fostered by the belief that with determination and hard work anything is possible.

Teaching Computing at Carlinghow Academy

We teach a curriculum that enables pupils to become confident, safe and effective users of technology. Across KS1 and KS2 pupils learn computing skills in isolation in order to embed the tools that they need to apply to their rapidly changing world. We provide opportunities for computing skills to be used across the wider curriculum.

At Carlinghow we deliver a high quality Computing curriculum which inspires curiosity and enables a progression of skills.

The aims of teaching Computing at Carlinghow Academy are:

* 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.

There is a ‘spiral’ approach to sequencing the units, with themes recurring year by year.

This provides ample opportunity for pupils to:

● consolidate technical skills

● achieve fluency with a range of key applications

● develop their knowledge and understanding of the principles that underpin digital technologies and the changing consequences of these for individuals and society.

Each year includes units covering the foundations, applications and implications of computing, ensuring that pupils progress in the computer science, information technology and digital literacy strands of the computing curriculum.

It also encourages creativity, collaboration and thinking skills.

Online Safety

At the start of every half-term we prepare pupils for their digital world with skills to navigate their online environment safely. We use the ‘Switched On Online Safety’ scheme to deliver this to the pupils.

The teaching content across ‘Switched on Online Safety’ is split into six key online safety strands:

• developing online safety guidelines

• social and emotional wellbeing and developing resilience

• responsible internet use

• keeping information safe

• digital citizenship

• playing games and having fun

Each strand is covered once in each year group.

Computing

Our pupils explore digital technology for purpose and build competence which they can apply. Implementation of the curriculum in lessons ensures a balanced coverage of Computer Science, Information Technology and Digital Literacy. We link our computing lessons to our topics alongside skills based teaching using the ‘Switched On Computing’ scheme.

The teaching content is structured around six units of work per year group, each of which has six sessions, or a half term’s worth of work.

Computer Science:

In computer science, pupils learn to program first with BeeBots, then ScratchJr, then Scratch and the micro:bit. This takes pupils from a physical manipulative in Key Stage 1, through a pictorial representation of code with to a virtual, on screen, manipulative in which text-based programming is made more accessible through a block-based language. It also ensures progression through key programming constructs, with pupils introduced to sequence with the BlueBot, repetition in ScratchJr, and selection and variables with Scratch and MakeCode for the micro:bit. They develop their computational thinking: the ability to apply programming skills to solve real world problems systematically.

Information Technology:

Pupils acquire skills in using core ‘office’ applications to work with text, multimedia presentations and data analysis, as well as a competency with digital media from photography and audio to video, animation and virtual reality. The programme of study for computing at Key Stage 1 requires that pupils be taught to ‘use technology purposefully to create, organise, store, manipulate and retrieve digital content’, and Switched On Computing ensures that they can do this using text, images, sound and video. Building on this at Key Stage 2, Switched On Computing helps them to ‘select, use and combine’ a variety of software on a range of devices. They work with both numerical data and information across a range of formats including those that combine both words and images.

Digital Literacy:

Pupils develop an understanding of how the Internet, the World Wide Web and search engines work, as well as learning how to use these and other technologies safely and responsibly.

Creativity:

We emphasise computing as a creative subject. Many units involve pupils in making digital artefacts, ranging from programs and presentations to virtual models and movies.

Collaboration:

We provide ample opportunity for pupils to learn together: in many units they work in pairs or small groups, and even when working individually there is opportunity built-in for them to give and receive feedback to others. Pupils become increasingly discerning in evaluating online content and their own and others’ work.

Thinking Skills:

We encourage pupils to think about digital technology: computational thinking concepts such as logic, algorithms, decomposition and abstraction are emphasised throughout. Pupils are regularly asked to consider the broader moral and ethical issues raised by the technologies they study

EYFS:

To equip our youngest learners with digital skills here at Carlinghow Academy we provide children with a broad, play-based experience of computing in a variety of contexts, including outdoor play.

Computing is not just about using iPads, laptops and digital equipment it is learning about how computers feature in the real world and providing children with computing scenarios.

Children gain skills, knowledge and confidence through opportunities to ‘paint and draw’ on the interactive whiteboard and explore ICT with equipment such as BeeBots, remote control toys and iPads.

KS1 and KS2:

* Children should do at least one Computing whole class session per week.
* The first session of the half-term is based on Online Safety with the following sessions based on Computing.

The online ‘Switched On Computing’ resources provide teachers with

* Unit plans
* Teaching slides
* Key Vocabulary slides
* Video Walkthroughs
* Pupils worksheets
* End of unit knowledge quiz

We prepare our pupils to apply their skills into a digital future, including potential careers. Pupils will leave Carlinghow Academy with the skills to use technology safely and effectively.

We measure the impact through the following:

* Every pupil has an on-line portfolio for their computing work which clearly demonstrates their achievements and progress.
* Opportunity for pupils to share their work with their peers and to get feedback on what went well, or what might have been better.
* Images and videos of the children’s practical learning uploaded onto Seesaw.
* Summative assessment of pupil’s learning.
* Interviewing the pupils about their learning – pupil voice.

**PROGRESSION OF KNOWLEDGE AND SKILLS FOR COMPUTING**

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| **COMPUTING IN THE EARLY YEARS** |
| **Three and Four Year Olds** | PSED* Remember rules without needing an adult to remind them.

Physical Development* Match their developing physical skills to tasks and activities in the setting.

Understanding the World* Explore how things work
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| **Reception** | PSED* Show resilience and perseverance in the face of a challenge.
* Know and talk about the different factors that support their overall health and wellbeing:

- sensible amounts of ‘screen time’.Physical Development* Develop their small motor skills so that they can use a range of tools competently, safely and confidently.

Expressive Arts and Design* Explore, use and refine a variety of artistic effects to express their ideas and feelings.
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| **ELG** | PSED* Managing Self - Be confident to try new activities and show independence, resilience and perseverance in the face of challenge.

Expressive Arts and Design* Creating with Materials - Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.
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| **COMPUTER SCIENCE****PROBLEM SOLVING AND PROGRAMMING** |
| **Year 1** | * Describe algorithms as sequences of instructions in everyday contexts.
* Plan a sequence of steps to solve real-life problems.
* Program floor robots using sequences of instructions (using directional language) to implement an algorithm.
* Create programs for floor robots and sprites on the screen using a number of steps in order before pressing the Go button.
* Begin to use conditional language like “if” and “when.”
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| **Year 2** | As above plus:* Describe algorithms as sequences of instructions or sets of rules in everyday contexts; understand the importance of order and accuracy of these.
* Program on screen using sequences of instructions to implement an algorithm.
* Create programs as sequences of instructions when programming on screen, correcting any errors.
* Begin to experiment with variables
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| **Year 3** | As above plus:* Design and write a program using a block language (programs to include movement, dialogue, sound effects, stages, sprites, loops and variables) without user interactions.
* Use sequence in programs.
* Write a program to produce output on screen.
* Explain how loops and random numbers are used in a program.
* Explain how conditional statements are used in a program.
* Understand what it means to decompose an algorithm and decompose a program into smaller parts.
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| **Year 4** | As above plus:* Design and write a program using a block language to a given brief, including simple interaction (programs to include variables, stages, artificial intelligence and a scoring system).
* Use sequence and repetition in programs.
* Write a program that accepts keyboard input and produces on-screen output.
* Develop their own simulation of a simple physical system on screen.
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| **Year 5** | As above plus:* Design, write and debug a program using a block language based on their own ideas (programs to include multiple sprites, multiple variables, sensors and conditional statements).
* Use sequence, selection and repetition in programs.
* Write a program that accepts keyboard and mouse input and produces output on screen and through speakers.
* Develop their own simple computer control application.
* Plan a solution to a problem using decomposition.
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| **Year 6** | As above plus:* Design, write and debug a program using a second programming language based on their own ideas (using loops, sprites that move in a variety of ways, allowing them to disappear and appear randomly, manipulate variables and use operators that determine an outcome of a conditional statement).
* Use sequence, selection, repetition and variables in programs.
* Write a program that accepts inputs other than keyboard and mouse and produces outputs other than screen or speakers.
* Design, write and debug their own computer control application. Solve problems using decomposition, tackling each part separately.
* Understand that coding is the use of programming languages to make games, programs and computers things.
* Write and adapt programmes using Javascript and Python (print command, run button, input command, random command).
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| **COMPUTER SCIENCE****LOGICAL REASONING** |
| **Year 1** | * Explain what they think a program will do.
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| **Year 2** | As above plus:* Give logical explanations of what a program will do under given circumstances, including some attempt at explaining why it does what it does.
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| **Year 3** | As above plus:* Use logical reasoning to predict outcomes and detect errors in programs.
* Use and explain a simple, sequencebased algorithm in their own words.
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| **Year 4** | As above plus:* Use logical reasoning to detect and correct errors in programs.
* Explain an algorithm using sequence and repetition in their own words.
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| **Year 5** | As above plus:* Explain a rule-based algorithm in their own words.
* Use logical reasoning to detect errors in algorithms.
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| **Year 6** | As above plus:* Give clear and precise logical explanations of a number of algorithms.
* Use logical reasoning to detect and correct errors in algorithms (and programs).
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| **COMPUTER SCIENCE****NETWORKS AND SEARCH ENGINES** |
| **Year 2** | * Explain and understand how an email is sent.
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| **Year 3** | As above plus:* Understand that email and videoconferencing are made possible through the internet.
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| **Year 4** | As above plus:* Use and explain how search engines work.
* Explain how the internet makes the web possible.
* Understand that search engines rank pages according to relevance.
* Create a webpage and explain how web pages are created and transmitted.
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| **Year 5** | As above plus:* Explain how search engines are ranked.
* Understand how data routing works on the internet.
* Explain how web pages are created and transmitted in their own words.
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| **Year 6** | As above plus:* Understand how mobile phone or other networks operate.
* Understand how domain names are converted into IP addresses on the internet.
* Appreciate that search engines rank pages based on the number and quality of in-bound links.
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| **INFORMATION TECHNOLOGY****SEARCHING** |
| **Year 3** | * Search for information within a single site.
* Describe how search engines select pages according to keywords found in the content.
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| **Year 4**  | As above plus:* Use a standard search engine to find information using a range of strategies to be more successful in finding reliable information.
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| **Year 5** | As above plus:* Use filters to make more effective use of a standard search engine.
* Understand that search engines use a cached copy of the crawled web to select and rank results
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| **Year 6** | As above plus:* Make use of a range of search engines appropriate to finding information that is required.
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| **DIGITAL LITERACY****(INCLUDING E-SAFETY)** |
| **Year 1** | * Identify what personal information is.
* Identify what to do if they see disturbing content online at home or at school.
* Identify ways to keep themselves safe while using digital technology.
* Understand that information on the internet can be seen by others.
* Describe some of the risks that occur on the internet.
* Show an awareness of how IT is used for communication beyond school.
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| **Year 2** | As above plus:* Explain what personal information is and develop awareness of why it is special and should not be shared.
* Explain what to do if they have concerns about content or contact online.
* Keep safe and show respect to others while using digital technology.
* Identify ways they can use the Internet to communicate with family and friends.
* Show an awareness of how IT is used for a range of purposes beyond school.
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| **Year 3** | As above plus:* Identify who they can trust and share their personal information with online.
* Use digital technology safely and show respect for others when working online.
* Identify how to report concerns and inappropriate behaviour in school.
* Recognise unacceptable behaviour when using digital technology.
* Decide whether a web page is relevant for a given purpose or question.
* Use email and videoconferencing in class appropriately.
* Explain and understand online protocols, in order to stay safe on the web.
* To identify cyberbullying and its consequences.
* Identify the risks on online gaming and know how to protect themselves.
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| **Year 4** | As above plus:* Demonstrate that they can act responsibly when using computers.
* Identify and explain the differences between acceptable and unacceptable behaviours when using digital technology.
* Know who to talk to about concerns and inappropriate behaviour at home or in school.
* Decide whether digital content is relevant for a given purpose or question.
* Collaboratively communicate with peers on a shared wiki appropriately.
* Begin to use a range of online communication tools, such as forums, email and polls in order to formulate, develop and exchange ideas.
* Describe the meaning of copyright and the importance of acknowledging sources
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| **Year 5** | As above plus:* Demonstrate that they can act responsibly when using the internet.
* Discuss the consequences of particular behaviours when using digital technology.
* Know how to report concerns and inappropriate behaviour in a range of contexts.
* Decide whether digital content is reliable and unbiased.
* Work collaboratively with peers on a class website or blog.
* Explain what is meant by copyright
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| **Year 6** | As above plus:* Show that they can think through the consequences of their actions when using digital technology.
* Identify principles underpinning acceptable use of digital technologies.
* Know a range of ways to report concerns and inappropriate behaviour in a variety of contexts.
* Articulate an opinion about the effectiveness of digital content.
* Use online tools to plan and carry out a collaborative project successfully.
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What is expected to be seen when teaching Computing?

* To prepare for lessons and understand the hardware/software required so that there is an understanding of the process the children will experience.
* Each child to working on their own device.
* The use of ‘Switched On Computing’ scheme’s slides for the lesson.
* Knowledge organisers need to be displayed in the class room.
* Children’s work needs to be saved on the server.
* Good examples of children’s work to be displayed in the classroom.

Differentation:

If a child is not working at their Age Related Level then units from the year group within that child’s working age can be used.

Monitoring:

* Global share to be monitored for evidence of children’s saved work.
* Seesaw to be monitored for evidence of children’s work, particularly cross-curricular work where technology can be used.
* End of unit quizzes to be used in order to inform understanding.
* Target Tracker to be used to monitor progress on a termly basis.
* Pupil voice - pupil interviews/questionnaires.

Examples of Computing Knowledge Organisers:



