

# RLT COMPUTING CURRICULUM





## RLT Computing Curriculum

### **Purpose:**

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.

### **Aims:**

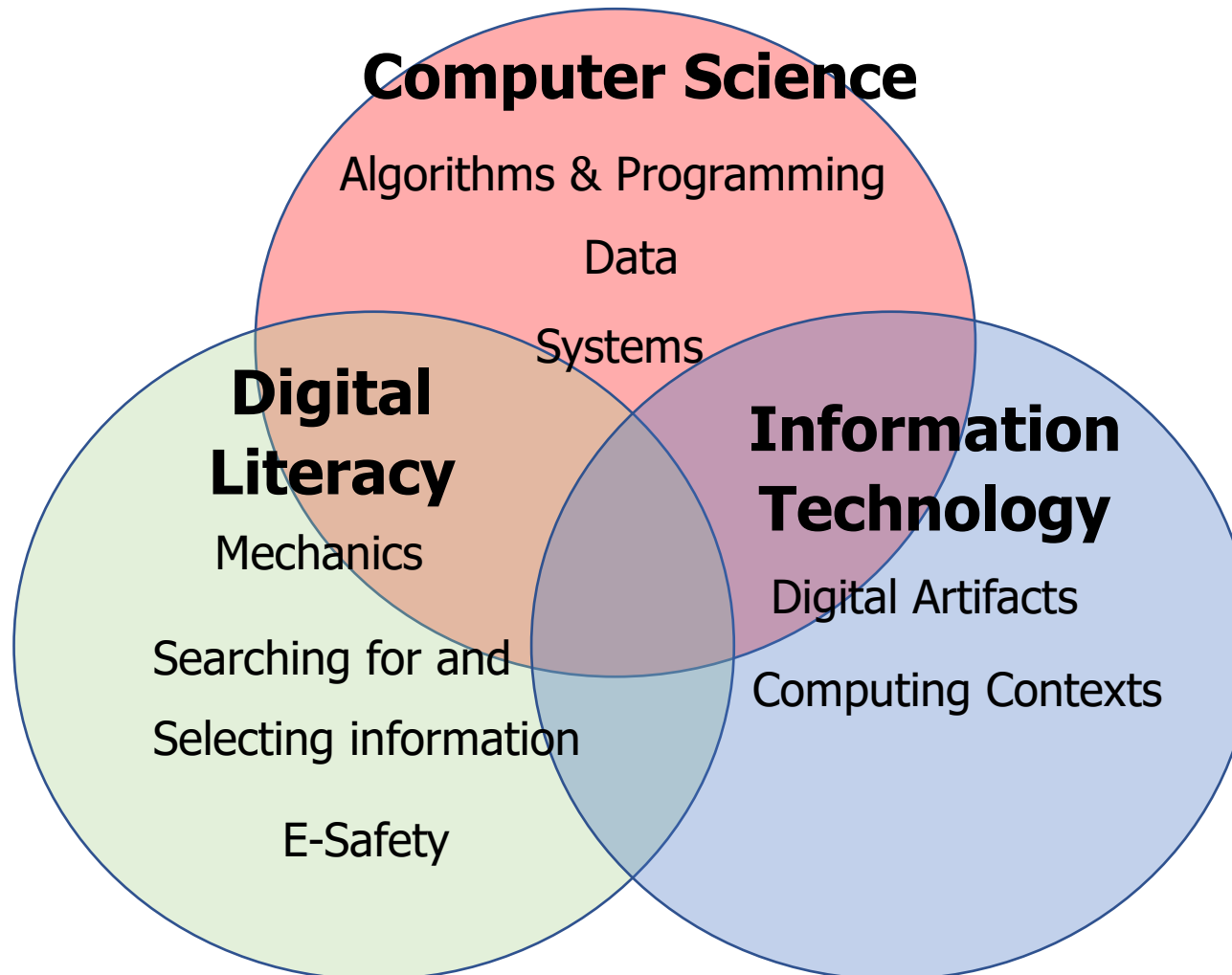
#### **Ensure that all pupils:**

- 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.



**Introduction:**

This document is designed to aid teachers in helping pupils to form a computing schema within their long-term memories of how computers operate, interpret, and execute instructions. Accurate mental models can also support pupils as they develop their programming skills, which in turn help them to avoid common misconceptions. An understanding of how systems and networks work, and the factors that affect their performance, enables pupils to design and evaluate solutions to real world scenarios, as well as understand the impact of those solutions on our lives. Our Computing Curriculum supports the development of the pupils' scheme through coverage of: Digital Literacy, Computer Science and Information Technology.



## Pillars of progression

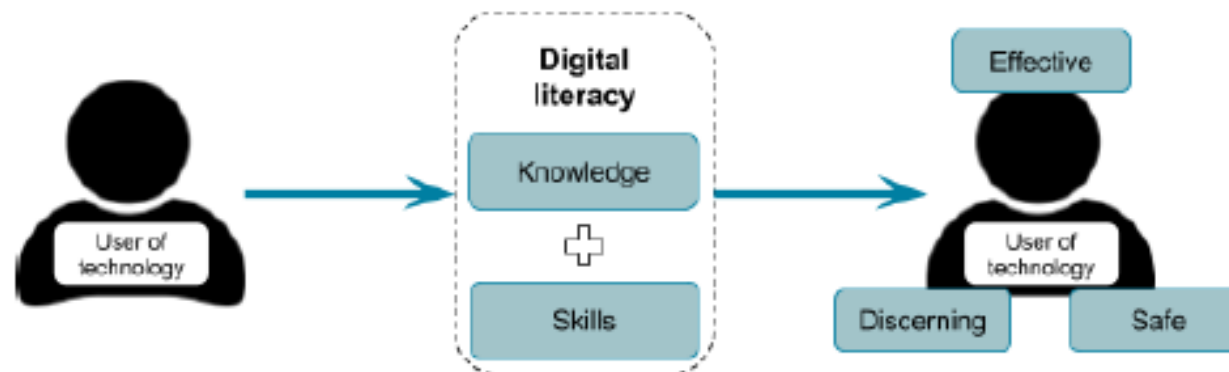
A useful way of thinking about progression in computing is to consider the 3 main content areas that pupils develop knowledge of:

- computer science
- information technology
- digital literacy

These 'pillars' of progression are visible in the aims of the national curriculum for computing. Children make progress in computing by knowing and remembering more about and, importantly, across each of these categories, and being able to apply this knowledge. However, these pillars do not sit separately from each other. Knowledge from each pillar complements the others and some subject content only exists at the interplay between these 3 pillars.

## Digital Literacy:

Young people need the skills, knowledge, and confidence to understand the digital world in which we live. In both their school and personal life, they will use technology to develop solutions to problems. An understanding of the technical, societal, and ethical aspects of technology will help them critically evaluate emerging applications and technologies. There are a range of terms to describe this body of skills and knowledge. In line with the national curriculum for England, we use the term **digital literacy**, which we define as: **The skills and knowledge required to be an effective, safe, and discerning user of a range of computer systems.**





### Computer Science:

It is important that teachers equip pupils with the knowledge and skills to thrive in a world where they are surrounded by computer systems and networks. An understanding of how our networks, systems, and devices work is foundational knowledge for all pupils of computing. Once learners identify the systems and networks around them, they can begin to look inside and discover the devices and components that work together to perform a task. Pupils begin to think about the inputs to a system, the processes it carries out, as well as the outputs it produces.

Computer science covers topics such as:

- how computer networks work
- algorithms
- sequence
- selection
- variables

### Information Technology:

Information technology is very broad as it involves the creation, organisation and manipulation of digital content. By understanding the core principles of computer science, pupils can gain an insight into what happens behind the screen and develop a curiosity to find out more. This awareness prepares pupils to access other areas of the computing curriculum, such as programming and creating media, where a knowledge of how information technology functions can broaden pupils' appreciation of the potential of technology.



### Declarative and procedural knowledge

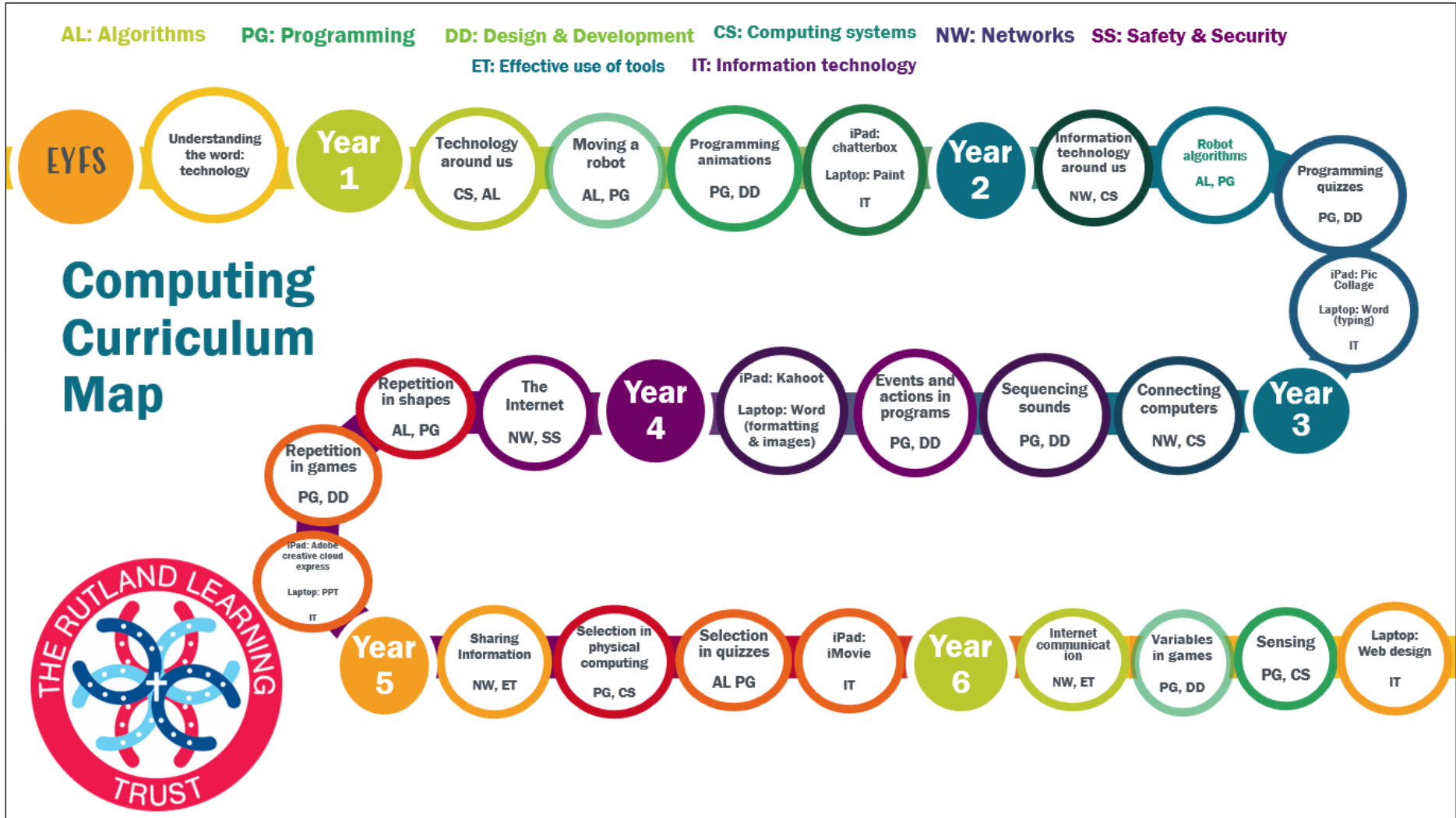
Declarative knowledge, often referred to as conceptual knowledge in the literature, consists of facts, rules and principles and the relationships between them. It can be described as 'knowing that'. In contrast, procedural knowledge is knowledge of methods or processes that can be performed. It can be described as 'knowing how'.

Examples of declarative and procedural knowledge across the 3 pillars can be seen in the table below.

Form of knowledge	Computer science	Information technology	Digital literacy
Declarative Knowing that...	Programming syntax The purpose and function of different logic gates	Principles of effective multimedia design Spreadsheet formulae	Features of unreliable content
Procedural Knowing how...	Performing binary addition Implementing a repeat in a programming language	Setting up a slide master Applying conditional formatting	How to perform an advanced web search



Computing Learning Journey:





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### Coverage: EYFS

	Range 3	Range 4	Range 5	Range 6	<u>Key vocabulary:</u>
<b>EYFS</b>	Anticipates repeated sounds, sights and actions, e.g when an adult demonstrates an action toy several times.	Seeks to acquire basic skills in turning on and operating some digital equipment	Knows how to operate simple equipment, e.g. turns on CD player, uses a remote control, can navigate touch-capability technology with support	Completes a simple program on electronic devices	Toy, programme, computer, iPad, Laptop, camera, microphone, torch, press, on, off, button and key.
	Shows interest in toys with buttons, flaps and simple mechanisms and begins to learn to operate them	Operates mechanical toys, e.g. turns the knob on a wind-up toy or pills back on a friction car.  Plays with water to investigate 'low technology' such as washing and cleaning  Uses pipes, funnels and other tools to carry/transport water from one place to another	Shows and interest in technological toys with knobs or pulleys, real objects such as cameras, and touchscreen devices such as mobile phones and tablets.  Shows skill in making toys work by pressing parts or lifting flaps to achieve effects such as sound, movements or new images  Knows that information can be retrieved from digital devices and the internet.	Uses ICT hardware to interact with age-appropriate computing software  Can create content such as a video recording, stories, and/or draw a picture on a screen  Develops digital literacy skills by being able to access, understand and interact with a range of technologies  Can use the internet with adult supervision to find and retrieve information of interest to them	Finding out and exploring  Being confident and willing to have a go.  Developing ideas of grouping, sequences cause and effect.

Year Group	Digital Literacy	Computer Science		Information Technology
1	<p><b>Technology around us: Recognising technology in school and using it responsibly</b></p> <p><a href="#">Lesson 1 – Technology in our classroom</a></p> <p><b>Rationale:</b> Year 1 begins with Technology around us to explore the range of technology we now use in our everyday lives. It is the beginning of learning how to use technology responsibly thinking about the rules to keep us safe.</p> <p><b>Outcome:</b> Children will be able to explain a variety of different pieces of technology used at school or home</p> <p><b>Links:</b> PSHE</p> <p><b>Vocabulary:</b> remote controlled, computers, cameras, tablets, phones, games, PlayStation, Alexa,</p>	<p><b>Moving a robot: Writing short algorithms and programs for floor robots and predicting program outcomes</b></p> <p><a href="#">Unit 1: Moving a Robot</a></p> <p><b>Rationale:</b> The children are introduced to algorithms and rules in programmes and they work on finding ways to make robots move where they want.</p> <p><b>Outcome:</b> Children will be able to show how to programme a beebot to move where along a specific route</p> <p><b>Links:</b> Art and design</p> <p><b>Vocabulary:</b> programme, rules, sequence, beebot, forward, right, left, backwards, instructions</p> <p><b>NC Objectives:</b></p>	<p><b>Programming animations: Designing and programming the movement of a character on screen to tell stories</b></p> <p><a href="#">Unit 2: Introduction to animation</a></p> <p><b>Rationale:</b> This unit progresses the children’s knowledge and understanding of programming and follows on from ‘Moving a robot’, they will use programming blocks to use, modify and create programs.</p> <p><b>Outcome:</b> Children will be able to create an animation using ScratchJr.</p> <p><b>Links:</b> Art and design</p> <p><b>Vocabulary:</b> programme, rules, sequence, algorithm, forward, right, left, backwards, instructions, commands</p> <p><b>NC Objectives:</b></p>	<p>iPad – ChatterPix</p> <p>Laptop - Paint</p>



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	<p><b>NC Objectives:</b>          § 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</p> <p><b>Think U Know</b>  <a href="#">Episode 1 – Watching Videos</a></p> <p><b>E-SAFETY</b>          ♣ 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</p>	<p>♣ understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions</p> <p>♣ use logical reasoning to predict the behaviour of simple programs</p>	<p>♣ understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions</p> <p>♣ Create and debug simple programs</p> <p>♣ use logical reasoning to predict the behaviour of simple programs</p>	
2	<p><b>Information technology around us: Identifying IT and how its responsible use improves our world in school and beyond</b></p> <p><a href="#">Lesson 3 – IT in the world</a></p> <p><b>Rationale:</b> Year 2 builds on the previous year by expanding their understanding of technology beyond our school and their homes to across the world.</p> <p><b>Outcome:</b> Children will know that the internet is something all around the world and contains information</p> <p><b>Links:</b> PSHE,</p> <p><b>Vocabulary:</b> network, internet, computers, phones, tablets, touch screen, information, www, world wide web</p> <p><b>NC Objectives:</b>          ♣ recognise common uses of information technology beyond school          ♣ 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</p> <p><b>Think U Know</b>  <a href="#">Episode 2 – Sharing Pictures</a></p> <p><b>E-SAFETY</b>          ♣ use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about</p>	<p><b>Robot algorithms: Creating and debugging programs and using logical reasoning to make predictions.</b></p> <p><a href="#">Unit 1: Robot Algorithms</a></p> <p><b>Rationale:</b> The children were introduced to algorithms and rules in programming in Year 1 and now they look to develop the skills to create more complex programs; they learn how to debug their programs and how to use logical reasoning to predict outcomes</p> <p><b>Outcome:</b> Children will be able to programme a robot but also solve a debugging issue.</p> <p><b>Links:</b> Design Technology</p> <p><b>Vocabulary:</b> rules, algorithms, programming, coding, instructions, debugging,</p> <p><b>NC Objectives:</b>          ♣ understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions          ♣ use logical reasoning to predict the behaviour of simple programs          ♣ create and debug simple programs</p>	<p><b>Programming quizzes: Designing algorithms and programs that use events to trigger sequences of code to make an interactive quiz</b></p> <p><a href="#">Unit 2: An introduction to quizzes</a></p> <p><b>Rationale:</b> This unit progresses the children’s knowledge and understanding of instructions in sequences and the use of logical reasoning to predict outcomes.</p> <p><b>Outcome:</b> Children modify designs to create their own quiz questions in ScratchJr using blocks of code</p> <p><b>Links:</b></p> <p><b>Vocabulary:</b> rules, algorithms, programming, coding, instructions, debugging,</p> <p><b>NC Objectives:</b>          ♣ understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions          ♣ Create and debug simple programs          ♣ use logical reasoning to predict the behaviour of simple programs          ♣ create and debug simple programs</p>	<p>IPad – Pic Collage</p> <p>Laptop – Word (Typing)</p>



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	<p>content or contact on the internet or other online technologies</p>			
3	<p><b>Connecting computers: Identifying that digital devices have inputs, processes and outputs, and how devices can be connected to make networks</b></p> <p><a href="#">Lesson 5 – How are computers connected?</a></p> <p><b>Rationale:</b> Key stage two begins with a greater understanding of key technological language such as inputs, outputs, and how devices are connected through networks.  <b>Outcome:</b> Children will be able to explain how different devices connect together  <b>Links:</b> PSHE and design technology  <b>Vocabulary:</b> input, output, hardware, software, connection, internet, networks</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ 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</li> </ul> <p><b>Think U Know</b>  <a href="#">Episode 3 – Playing Games</a></p> <p><b>E-SAFETY</b></p> <ul style="list-style-type: none"> <li>♣ use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact</li> </ul>	<p><b>Sequencing sounds:          Creating sequences in a block-based programming language to make music</b></p> <p><a href="#">Unit 1: Sequence in Music</a></p> <p><b>Rationale:</b> The children will learn to create sequences of blocks to create a sound programme  <b>Outcome:</b> Children will be able to create a sequence for a sound programme.  <b>Links:</b> Music  <b>Vocabulary:</b> sequencing, coding, blocks, insert, debugging, algorithm, instructions</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>♣ design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> </ul>	<p><b>Events and actions in programs:          Writing algorithms and programs that use a range of events to trigger sequences of actions</b></p> <p><a href="#">Unit 2: Events and Actions</a></p> <p><b>Rationale:</b> This unit introduces the Scratch programming environment and the concept of sequences which builds on their knowledge and use of ScratchJr in KS1.  <b>Outcome:</b> Children will be able to design and code their own maze-tracing program.  <b>Links:</b>  <b>Vocabulary:</b> sequencing, coding, blocks, insert, debugging, algorithm, instructions</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>♣ Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> <li>♣ design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>♣ 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</li> </ul>	<p>iPad – Kahoot</p> <p>Laptop – Word (formatting and images)</p>
4	<p><b>The Internet: Recognising the internet as a network of networks including the WWW, and why we should evaluate online content</b></p> <p><a href="#">Lesson 2 – What is the internet made of?</a></p> <p><b>Rationale:</b> Building on from Year 3 the children begin to understand the internet as a network across the world and how it can be useful but needs to be used with caution. The children will look at how to find reliable information.  <b>Outcome:</b> Children will be able to explain the positives and negatives of the internet  <b>Links:</b> PSHE</p>	<p><b>Repetition in shapes: Using a text-based programming language to explore count-controlled loops when drawing shapes</b></p> <p><a href="#">Unit 1: Repetition in Shapes</a></p> <p><b>Rationale:</b> This unit progresses the children’s knowledge and understanding of programming. It progresses from the sequence of commands in a program to using count-controlled loops.  <b>Outcome:</b> Children will be able to create algorithms and then implement those algorithms as code.  <b>Links:</b>  <b>Vocabulary:</b> sequencing, coding, blocks, insert,</p>	<p><b>Repetition in games:          Using block-based programming language to explore count-controlled and infinite loops when creating a game</b></p> <p><a href="#">Unit 2: Repetition in Games</a></p> <p><b>Rationale:</b> The children will explore the concept of repetition in programming using the Scratch environment building on their knowledge from the previous unit.  <b>Outcome:</b> Children will be able to design and create a game which uses repetition, applying stages of programming design throughout.</p>	<p>iPad – Adobe Creative Cloud Express</p> <p>Laptop – Power Point</p>



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	<p><b>Vocabulary:</b> networks, world wide web, www, internet, devices, online, information, fake news, email,</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ 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</li> <li>♣ use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</li> </ul> <p><b>Think U Know</b>  <a href="#">Play Like Share</a></p> <p><b>E-SAFETY</b></p> <ul style="list-style-type: none"> <li>♣ use technology safely, respectfully, and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact</li> </ul>	<p>debugging, algorithm, instructions</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>♣ design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>♣ 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</li> <li>♣ Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> </ul>	<p><b>Links:</b>  <b>Vocabulary:</b> sequencing, coding, blocks, insert, debugging, algorithm, instructions, count-controlled loops, indefinite loops</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>♣ design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>♣ 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</li> <li>♣ Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> </ul>
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5	<p><b>Sharing information: Identifying and exploring how information is shared between digital systems</b></p> <p><a href="#">Lesson 4 – Working together</a></p> <p><b>Rationale:</b> Building on from Year 4 the children progress their knowledge and understanding of computing systems and online collaborative working by developing their understanding of computer systems and how information is transferred between systems and devices.</p> <p><b>Outcome:</b> Children will be able to take part in a collaborative online project with other class members and develop their skills in working together online.</p> <p><b>Links:</b></p> <p><b>Vocabulary:</b> networks, world wide web, www, internet, devices, online, information, fake news, email,</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ 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</li> <li>♣ use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</li> <li>♣ 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</li> </ul> <p><b>Project Evolve</b>  <a href="#">Self-Image and Identity</a>  <a href="#">Jigsaw Video</a></p> <p><b>E-SAFETY</b></p> <ul style="list-style-type: none"> <li>♣ use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact</li> </ul>	<p><b>Selection in physical computing: Exploring conditions and selection using programmable microcontroller</b></p> <p><a href="#">Unit: Selection in Physical Computing</a></p> <p><b>Rationale:</b> This unit builds on prior experience of programming using a block-based language (eg Scratch) and understanding of concepts of sequence and repetition from Year 4. The children will be introduced to a microcontroller (Crumble controller) and learn how to connect and program it to control components (including output devices — LEDs and motors).</p> <p><b>Outcome:</b> Children will be able to design and make a working model of a fairground carousel.</p> <p><b>Links:</b> science – electricity, DT</p> <p><b>Vocabulary:</b> sequencing, coding, blocks, insert, debugging, algorithm, instructions, count-controlled loops, indefinite loops, control components, LED, motors, output devices, microcontroller</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>♣ design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>♣ 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</li> <li>♣ Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> </ul>	<p><b>Selection in quizzes:</b> Exploring selection in programming to design and code an interactive quiz</p> <p><a href="#">Unit: Selection in Quizzes</a></p> <p><b>Rationale:</b> The children will develop their knowledge of ‘selection’ by revisiting how ‘conditions’ can be used in programming, and then learning how the ‘if... then... else...’ structure can be used to select different outcomes depending on whether a condition is ‘true’ or ‘false’.</p> <p><b>Outcome:</b> Children will be able to write programs that ask questions and use selection to control the outcomes based on the answers given</p> <p><b>Links:</b></p> <p><b>Vocabulary:</b> sequencing, coding, blocks, insert, debugging, algorithm, instructions, count-controlled loops, indefinite loops, control components, LED, motors, output devices, microcontroller</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>♣ design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>♣ 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</li> <li>♣ Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> </ul>	iPad – iMovie
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6	<p><b>Internet communication:</b>  <b>Recognising how the WWW can be used to communicate and be searched to find information</b>  <a href="#">Computing Systems and Networks – Communication</a></p> <p><b>Rationale:</b> Building on from Year 5 the children progress their knowledge and understanding of computing systems and online collaborative working by developing their understanding of the WWW as a communications tool.</p> <p><b>Outcome:</b> Children will be able investigate different methods of communication, before focusing on internet based communication. They will be able to evaluate what influences searches and comparing search engines.</p> <p><b>Links:</b>  <b>Vocabulary:</b> networks, world wide web, www, internet, devices, online, information, fake news, email,</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ 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</li> <li>♣ use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content</li> <li>§ 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</li> </ul> <p><b>Project Evolve</b>  <a href="#">Online Bullying</a></p> <p><b>E-SAFETY</b></p> <ul style="list-style-type: none"> <li>♣ use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact</li> </ul>	<p><b>Variables in games: Exploring variables when designing and coding a game</b>  <a href="#">Unit 1: Variables in Games</a></p> <p><b>Rationale:</b> This unit builds on prior experiences of programming in Scratch. Developing their understanding of the programming constructs of sequence, repetition, and selection by exploring the concept of variables in programming through games in Scratch.</p> <p><b>Outcome:</b> Children will be able to apply their knowledge of variables and design to improve their games in Scratch.</p> <p><b>Links:</b>  <b>Vocabulary:</b> sequencing, coding, blocks, insert, debugging, algorithm, instructions, count-controlled loops, indefinite loops, control components, LED, motors, output devices, variables, values, modify</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>♣ design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>§ 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</li> <li>♣ Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> </ul>	<p><b>Sensing: Designing and coding project that captures inputs from a physical device</b>  <a href="#">Unit 2: Sensing</a></p> <p><b>Rationale:</b> This unit is the final KS2 programming unit and brings together elements of all the four programming constructs: sequence from Year 3, repetition from Year 4, selection from Year 5, and variables</p> <p><b>Outcome:</b> Children will be able to apply their knowledge of the programming constructs and use their design to create their own micro:bit-based step counter</p> <p><b>Links:</b>  <b>Vocabulary:</b> sequencing, coding, blocks, insert, debugging, algorithm, instructions, count-controlled loops, indefinite loops, control components, LED, motors, output devices, microcontroller</p> <p><b>NC Objectives:</b></p> <ul style="list-style-type: none"> <li>♣ use sequence, selection, and repetition in programs; work with variables and various forms of input and output</li> <li>♣ design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts</li> <li>§ 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</li> <li>♣ Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs</li> </ul>	<p>Laptop – Web Page Design</p> <p>Webpage creation:          Designing and creating webpages giving consideration to copyright, aesthetics and navigation</p>
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Year Group	Digital Literacy	Information Technology	Computer Science
EYFS	<ul style="list-style-type: none"> <li>can recognise, online or offline, that anyone can say 'no' / 'please stop' / 'I'll tell' / 'I'll ask' to somebody who makes them feel sad, uncomfortable, embarrassed or upset</li> <li>know rules that help keep us safe and healthy in and beyond the home when using technology</li> </ul>	<ul style="list-style-type: none"> <li>can recognise some ways in which the internet can be used to communicate</li> <li>can give examples of how I (might) use technology to communicate with people I know</li> </ul>	<ul style="list-style-type: none"> <li>know names of items we control in the everyday environment</li> <li>know how to use everyday technology</li> <li>To explore on screen activities – by clicking (cause and effect)</li> <li>know that an algorithm is a set of instruction that can solve a problem</li> <li>know how to create a simple algorithm</li> </ul>
1	<ul style="list-style-type: none"> <li>know how to use technology safely</li> <li>know how to Keep personal information private</li> <li>can recognise common uses of information technology beyond school</li> </ul>	<ul style="list-style-type: none"> <li>Know how to use technology purposefully to create digital content</li> <li>Know how to use technology purposefully to store digital content</li> <li>Know how to use technology purposefully to retrieve digital content</li> </ul>	<ul style="list-style-type: none"> <li>know what algorithms are</li> <li>Know how to Combine forwards and backwards commands to make a sequence</li> <li>Know how to Combine four direction commands to make a sequence</li> <li>Know how to choose a command for a given purpose</li> <li>Know that a series of commands can be joined together</li> <li>Know the effect of changing a value</li> <li>Know how to create simple programs</li> <li>Know how to use an algorithm to create a program</li> </ul>
2	<ul style="list-style-type: none"> <li>Know how to use technology respectfully Identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies</li> </ul>	<ul style="list-style-type: none"> <li>Know how to use technology purposefully to organise digital content</li> <li>Know how to use technology purposefully to manipulate digital content</li> </ul>	<ul style="list-style-type: none"> <li>Know that algorithms are implemented as programs on digital devices</li> <li>Know that a series of instructions make a sequence</li> <li>Know that a sequence of commands has a start and an outcome</li> <li>know that programs execute by following precise and unambiguous instructions</li> <li>Know how to debug simple programs</li> <li>Know how to Use logical reasoning to predict the behaviour of simple program</li> </ul>
3	<ul style="list-style-type: none"> <li>Use technology responsibly Identify a range of ways to report concerns about contact</li> <li>know how digital devices function</li> <li>can identify input and output devices</li> <li>can recognise how digital devices can change the way we work</li> <li>knows how a computer network can be used to share information</li> </ul>	<ul style="list-style-type: none"> <li>Know how to use search technologies effectively</li> <li>Use a variety of software to accomplish given goals</li> <li>Collect information</li> <li>Know how to design and create content</li> <li>Present information</li> </ul>	<ul style="list-style-type: none"> <li>Know how to write programs that accomplish specific goals</li> <li>Know that a sequence of commands has an order</li> <li>Know how to use sequence in programs</li> <li>Know the relationship between an event and an action</li> <li>Know how to program movement in four directions</li> <li>Know how to adapt a program by adding additional features</li> <li>Work with various forms of input</li> <li>Work with various forms of output</li> <li>Know how to identify and fix bugs in a program</li> </ul>
4	<ul style="list-style-type: none"> <li>Understand the opportunities computer networks offer for communication</li> <li>Know how networks physically connect to other networks</li> <li>Know how networked devices make up the internet</li> <li>Know how websites can be shared on www</li> <li>Can evaluate the consequences of unreliable content</li> <li>Identify a range of ways to report concerns about content</li> <li>Recognise acceptable / unacceptable behaviour</li> </ul>	<ul style="list-style-type: none"> <li>Know how to select a variety of software to accomplish given goals</li> <li>Select, use and combine internet services</li> <li>Know how to analyse information</li> <li>Know how to evaluate information</li> <li>Know how to Collect data</li> <li>Know how to present data</li> </ul>	<ul style="list-style-type: none"> <li>Know that accuracy in programming is important</li> <li>Know how to design programs that accomplish specific goals</li> <li>Know how to design and create programs</li> <li>Know how to create a program in a text-based language</li> <li>Know how to modify a count-controlled loop to produce a given outcome</li> </ul>



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			<ul style="list-style-type: none"> <li>• Know that in programming there are infinite loops and count-controlled loops</li> <li>• Know how to debug programs that accomplish specific goals</li> <li>• Know how to use repetition in programs</li> <li>• Know how to Control or simulate physical systems</li> <li>• Use logical reasoning to detect and correct errors in programs</li> <li>• Understand how computer networks can provide multiple services, such as the world wide web</li> <li>• Appreciate how search results are selected</li> </ul>
5	<ul style="list-style-type: none"> <li>• Understand the opportunities computer networks offer for collaboration</li> <li>• Know that computers can be connected together to form systems</li> <li>• Know how information is transferred over the internet</li> <li>• Know that sharing information online lets people in different places work together</li> <li>• Be discerning in evaluating digital content</li> </ul>	<ul style="list-style-type: none"> <li>• Know how to combine a variety of software to accomplish given goals</li> <li>• Know how to select use and combine software on a range of digital devices</li> <li>• Know how to analyse data</li> <li>• Know how to evaluate data</li> <li>• Design and create systems</li> </ul>	<ul style="list-style-type: none"> <li>• Know how to Solve problems by decomposing them into smaller parts</li> <li>• Know how selection is used in computer programs</li> <li>• Know how to selection in programs Work with variables</li> <li>• Know how to use selection in an infinite loop</li> <li>• Know how to use logical reasoning to explain how some simple algorithms work</li> <li>• Know how to logical reasoning to detect and correct errors in algorithms</li> <li>• Know how to create a simple circuit connected to a computer</li> <li>• Know how to write a program that includes count-controlled loops</li> <li>• Understand computer networks including the internet</li> <li>• Appreciate how search results are ranked</li> </ul>
6	<ul style="list-style-type: none"> <li>• Understand a range of ways to use technology respectfully</li> <li>• Know how to use a search engine</li> <li>• Know how a search engine ranks its results</li> <li>• Recognise inappropriate content</li> <li>• Recognise inappropriate contact</li> <li>• Recognise inappropriate conduct</li> <li>• Know how to report concerns</li> <li>• Reuse digital artefacts for a given audience</li> <li>• Attend to usability of digital artefacts</li> <li>• Understand a range of ways to use technology safely</li> </ul>	<ul style="list-style-type: none"> <li>• Undertake creative projects with challenging goals</li> <li>• Know how to use multiple applications [Work with] applications across a range of devices</li> <li>• Know how to collect data</li> </ul>	<ul style="list-style-type: none"> <li>• Can define a variable as something that is changeable</li> <li>• Know why a variable is used in programming</li> <li>• Know how to improve programs by using variables</li> <li>• Use a programming language to solve computational problems</li> <li>• Know how to create a program to run on a controllable device</li> <li>• Understand that selection can control the flow of a program</li> <li>• Know how to use a conditional statement to compare a variable to a value</li> <li>• Know how to use inputs and outputs on a controllable device</li> </ul>

### Middle leader questions - Deep Dive in IT



## RLT Computing Curriculum

Questions	Responses
<p>Outline your role and areas of responsibility - what training have you had in computing?</p> <p>What's working well in computing? Key achievements in this subject area - things to celebrate? Challenges? Areas to be developed - priorities? Why - rationale? How are you supported to do your leadership role effectively? Have you made any recent changes to your computing curriculum? <b><u>Why?</u></b></p> <p><b>Briefly describe the school's vision, aims and ambition for computing? Your intent.</b> What is the purpose of computing within your curriculum and what are you trying to achieve?</p> <p><b>What is computing's profile within the school?</b></p> <p>What are the <b>timetabling</b> arrangements for your subject? What form does the computing curriculum take? (discrete, topic based, cross-curricular?) Have you allocated enough time to particular units or topics to make sure they're broad and deep enough?</p> <p><b>Talk me through your computing curriculum</b></p> <p>How is the computing curriculum planned/designed/organised/mapped out? Why? What is the RATIONALE for the ordering of the content? How do you know what is taught term by term in this subject?</p> <p><b>Do all teachers know what pupils need to know, and be able to do, by the end of the unit/term/year?</b></p> <p>Are the knowledge - concepts, skills, vocabulary and understanding you</p>	



want pupils to gain clearly laid out in your curriculum maps and/or planning?

**What are the most important concepts pupil learned during the early years?**

Can you use a specific example from your computing curriculum to show me what pupils learning in early years prefer prepares them for year one?

**Computing curriculum**

**Computer science** – What does this mean to your school?

Within the computing curriculum, what knowledge of computer science do pupils learn?

How does pupils' knowledge of algorithms increase in complexity?

How does the school plan for progression in programming?

What does it mean to get better in computing?

How does the curriculum enable pupils to 'get better' at **programming**?

**Information technology** – What does this look like in your school?

Create programs, systems and a range of content

What knowledge is it important for pupils to develop to create (spreadsheets/presentations/videos/images/animations)?

How do you plan for progression in...?

How is this developed and build upon across each key stage?

How is pupils' knowledge of how computers are used developed over time?

**Digital Literacy** - What does it mean to be digitally literate in your school?

Can you show me how pupils are taught to use, and express themselves and develop their ideas through, information and communication technology - safely?

How do you ensure that pupils learn to use digital devices safely, efficiently and responsibly?

How does a pupil's knowledge of e-safety build over time? What would be different between KS1/KS2?



**Which aspects of your computing curriculum are revised and repeated?  
Why? How? When?**

**Outline your school's approach to assessment in computing - rationale**  
Formative and summative assessment strategies

**What is the school's way of measuring progress?**

How do teachers ensure that pupils have learned/understood/remembered the key concepts for each unit - long term? How do you capture this information?

What are the typical gaps in pupils' knowledge and skills in this subject area?

Is the curriculum planned and sequenced to address these gaps?

How strong is **teacher subject knowledge**?

**How do teachers ensure all pupils are challenged in computing/programming?**

How do you **adapt the curriculum** to meet different needs (SEND and HAP)

**How ambitious is your curriculum for SEND or disadvantaged pupils?**

**How do you ensure your intent is implemented fully and successfully across the school?** Is the planned curriculum the enacted curriculum?

HDYK

**How do you evaluate the effectiveness or impact of computing?**

What is your monitoring telling you?

Pupil interviews: What do the children say about computing?

Staff discussions: Does the curriculum design help pupils know and remember more?

Planning scrutiny: Is planning effective?

Lesson visits: What do we see in lessons?

**Action plan discussion**

Key priorities and key actions to address them.



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