

## Programming

Programming is writing computer code to create a program, to solve a problem. Programs are created to implement algorithms. Algorithms can be represented as pseudocode or a flowchart, and programming is the translation of these into a computer program. To tell a computer to do something, a program must be written to tell it exactly what to do and how to do it. If an algorithm has been designed, the computer program will follow this algorithm, step-by-step, which will tell the computer exactly what it should do. What is a programming language? A programming language is an artificial language that a computer understands. The language is made up of series of statements that fit together to form instructions. These instructions tell a computer what to do.

Year one	Year two	Year three	Year four	Year five	Year six
<p><u>We are treasure hunters.</u> In this unit, the children will program a toy to move around a map to find buried treasure. They will start by thinking of algorithms for their routes, then input these as stored programs for the robot. They predict how the robot will move and will debug their programs.</p>	<p><u>We are astronauts</u> In this unit, the children will build on work from Unit 1.1 – We are treasure hunters to program a sprite (such as a spaceship) to move around the screen. This unit acts as a springboard for programming in Year 3.</p>	<p><u>We are programmers</u> In this unit, the children create an animated cartoon using characters they design. They use a paint tool to create characters and backgrounds. They then create an animation by translating a storyboard into a series of scripted instructions (program) for graphic objects.</p>	<p><u>We are software developers</u> The pupils start by playing and analysing educational computer games, identifying those features that make a game successful. They then plan and design a game, with a clear target audience in mind. They create a working prototype, and then develop it further to add functionality and improve the user interface. They test</p>	<p><u>We are game developers</u> The pupils plan their own simple computer game. They design characters and backgrounds, and create a working prototype, which they develop further based on feedback they receive.</p>	<p><u>We are adventure gamers</u> In this unit, the pupils learn a few commands of a text-based programming language (Python), enabling progression from Scratch. They create a simple, text-based adventure game</p>

			their game and make any necessary changes.		
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### Computational thinking

Computers can be used to help solve problems. However, before a problem can be tackled, the problem itself - and the ways in which it could be solved - needs to be understood. Computational thinking helps with this. It allows us to take a complex problem, understand what the problem is and develop possible solutions. These solutions can then be presented in a way that a computer, a human, or both, can understand. Three important elements of computational thinking are: decomposition, abstraction & algorithmic thinking. Computational thinking involves taking a complex problem and breaking it down into a series of small, more manageable problems. Each of these smaller problems can then be looked at individually.

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<p><u>We are TV chefs</u> In this unit, pupils produce short videos of themselves making a healthy meal or snack. They also decompose a complex problem into smaller parts – an important idea from computer science.</p>	<p><u>We are games testers</u> In this unit, the pupils will try to work out how some simple Scratch games work. They also look at free online or open source games and share their favourite games with the class.</p>	<p><u>We are bug fixers</u> In this unit, the children work with six example Scratch projects. They explain how the scripts work, finding and correcting errors in them, and explore creative ways of improving them. The children learn to recognise some common types of</p>	<p><u>We are toy designers</u> In this unit, the children work together to design a simple toy that incorporates sensors and outputs and then create an on-screen prototype of their toy in Scratch. Finally, they pitch their toy idea to a</p>	<p><u>We are cryptographers</u> The pupils learn more about communicating information securely through an introduction to cryptography (the science of keeping communication and information secret). They investigate early methods of communicating</p>	<p><u>We are computational thinkers.</u> In this unit, the pupils participate in some hands-on unplugged activities that help them to develop an understanding of some important algorithms. They also investigate these when implemented as</p>

		programming error, and practise solving problems through logical thinking.	Dragons' Den-style panel.	over distances, learn about two early ciphers, and consider what makes a secure password.	Scratch or Snap! programs.
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### Computer networks

A network is two or more computers (or other electronic devices) that are connected together, usually by cables or Wi-Fi. Some computer networks will have a server. A server is a powerful computer that often acts as a central hub for services in a network, eg emails, internet access and file storage. Each computer connected to a server is called a client. A computer that is not connected to a network is called a standalone computer. Using a network allows you to share: hardware, such as a printer, software, allowing multiple users to run the same programs on different computers, data, so that other people can access shared work and you can access your data from any computer on the network. Networking is critical if you want to use your computer to communicate. Without it you couldn't send an email, a text or an instant message.

Year one	Year two	Year three	Year four	Year five	Year six
<u>We are collectors</u> In this unit, the pupils will use web search engines to collect pictures of different types of animals and then explore ways in which those pictures can be organised.	<u>We are researchers</u> The children research a topic – safely, effectively and efficiently – using a structured approach (mind mapping). They share their findings with others through a short multimedia presentation	<u>We are network engineers</u> In this unit, the pupils investigate how computer networks work. They use a simulation and learn some simple command prompt (C:) tools for testing network connections.	<u>We are HTML editors</u> In this unit the children learn about the history of the web, before studying HTML (hypertext mark-up language), the language in which web pages are written. They learn to edit and write	<u>We are web developers</u> In this unit, the pupils work together to create a website explaining e-safety and responsible online behaviour.	<u>We are network technicians</u> In this unit, the pupils use unplugged activities to develop their understanding of networks; they learn about the domain name system and explore the school's

			HTML, and then use this knowledge to create a web page.		network infrastructure.
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### Creativity

Creativity involves transforming your ideas, imagination, and dreams into reality. When you're being creative, you can see the hidden patterns, make connections between things that aren't normally related, and come up with new ideas. Creative ability depends on creative thinking which is part hard work but largely creative problem-solving. The goal of computational creativity is to model, simulate or replicate creativity using a computer, to achieve one of several ends.

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<u>We are painters</u> This unit will particularly engage children who love the illustrations in the books they read. It is a great opportunity for the children to work creatively.	<u>We are photographers</u> In this unit, the children review photos online, practise using a digital camera, take photos to fit a given theme, edit their photos, and then select their best images to include in a shared portfolio.	<u>We are presenters</u> Do your children love watching sport or other performances on TV? This unit gives them a chance to make a short narrated video of themselves practising a sport or other skill, and to use this to help improve their performance.	<u>We are musicians</u> How many children in your class play an instrument? How many of them like singing, or simply enjoy listening to music? In this unit, the children produce music suitable for any purpose they choose.	<u>We are artists</u> The pupils use vector and turtle graphics to explore geometric art, taking inspiration from the work of Escher, Riley and traditional Islamic artists, as well as experimenting with complex 'fractal' landscapes.	<u>We are advertisers</u> In this unit, the pupils review existing adverts or promotional films, create a storyboard, shoot original footage, source other media and edit a final version of their movie.

Communication/collaboration

Communication is the sending and receiving of information and can be one-on-one or between groups of people, and can be face-to-face or through communication devices. Communication requires a sender, the person who initiates communication, to transfer their thoughts or encode a message. This message is sent to the receiver, a person who receives the message, and finally, the receiver must decode, or interpret the message. Collaboration is the process of two or more individuals working together to complete a task or achieve a common objective. Effective collaboration necessitates interpersonal skills, communications skills, knowledge sharing, and coordination.

Year one	Year two	Year three	Year four	Year five	Year six
<p><u>We are storytellers</u> In this unit, the children create a talking book that they can share with others.</p>	<p><u>We are detectives</u> In this unit, the children are challenged to solve a mystery by reading, sending and replying to emails, and by listening to a witness statement. They use a fact file sheet to create a table and identify the culprit.</p>	<p><u>We are communicators</u> This unit allows the children to learn about a number of e-safety matters in a positive way. They will work with a partner in another class, learning how to use email and video conferencing safely.</p>	<p><u>We are co-authors</u> Wikipedia is a free online encyclopaedia that anyone can view and edit. In this unit, the pupils collaborate to create a 'mini-Wikipedia'. They then go on to add or amend content on the real Wikipedia.</p>	<p><u>We are bloggers</u> Blogging provides a worldwide audience for pupils' work. Commenting on others' work extends pupils' sense of membership of a learning community beyond school. In this unit, pupils create a media-rich blog, comment on blogs and respond to comments.</p>	<p><u>We are publishers</u> In this unit, the pupils produce a class yearbook or school magazine using desktop publishing tools. They source, write, edit and combine images and text from a range of sources.</p>

## Productivity

Productivity software is a category of application programs that help users produce things such as documents, databases, graphs, worksheets and presentations. The definition of productivity software is sometimes broadened to include any type of application that is used to help people do their jobs, including collaboration and communication programs. Productivity software increases that efficiency by facilitating people's tasks. For example, processing application, such as Microsoft Word, which yields digital files, makes the tasks of creating, editing, storing and sharing documents much more efficient. Similarly, database management systems greatly simplify the tasks of storing, retrieving and working with data while also enormously expanding the capabilities of data manipulation and analysis.

Year one	Year two	Year three	Year four	Year five	Year six
<p><u>We are celebrating</u> In this unit, pupils will have the opportunity to create a digital greetings card, which could be used for a religious festival such as Diwali or Christmas, pupils' birthdays, or simply to say thank you or good luck.</p>	<p><u>We are zoologists</u> In this unit, the children go on a bug hunt, recording and identifying the small animals they find. They then organise the data they have collected, record it using a graphing package, and interpret the graph to answer questions about the animals.</p>	<p><u>We are opinion pollsters</u> In this unit, the children create their own opinion poll, seek responses, and then analyse the results.</p>	<p><u>We are meteorologists</u> This unit brings together data measurement, analysis and presentation, as the children take on the role of meteorologists and weather presenters.</p>	<p><u>We are architects</u> In this unit, the pupils research examples of art gallery architecture, before using Trimble SketchUp to create their own virtual gallery. Finally, they use the gallery to exhibit their own artwork.</p>	<p><u>We are travel writers</u> In this unit, the pupils document an educational visit. They research their destination and explore different routes. While there, they capture photographs, audio and video. On return they add this content to a digital map.</p>

## Computing scheme

The scheme we use (Switched On by Rising Stars) encompasses and includes computing science, IT skills and digital literacy.

**Digital literacy** is the ability to navigate, evaluate, and communicate information online or in a digital format. You can generally break down the concept of digital literacy into three main skills. These are:

How you consume information - this is the ability to complete digital tasks.

How you create information - this skill includes everything from making and editing videos to writing articles.

How you communicate information - once you have information, you'll need to know how to share it. Communication can look like many different things — from composing a tweet to sending an email to share documents online.

From school to the workforce, digital literacy is vital in many areas of life — but simply, having it is an absolute necessity for anyone who uses the internet. Sometimes forms and applications are only available online, so you'll need to be comfortable accessing and using them. The ability to evaluate whether a website is authentic or not can save you from headaches, and knowing how to share documents can help keep workflow moving. In short, digital literacy is a necessary skill for navigating in our modern, digital world.

**Computer science** is the study of computers and how they work, including software, hardware, and algorithms. An algorithm is a list of instructions for completing a task. In computer science, an algorithm tells the computer what to do and how to do it. Computer science is an umbrella term that covers everything from artificial intelligence and data science to robotics, game development, cybersecurity, and more. Computer science involves everything to do with computing.

The basis of all good **IT skills** is a mixture of getting your computer to do what you *want* it to do and understanding what your computer *can* do, and *how* it does it. Computers, although they are machines, nevertheless have a "mind" which needs to be understood. The best thing to say to a computer that doesn't respond to your demand is "Let me put it another way". Good IT skills are not only useful tools for researching and presenting your work, they also reduce stress, save time and save money.