Computing

Curriculum Plan

COMPUTING

Purpose of study

A high-quality computing education equips pupils to understand and change the world through logical thinking and creativity, including by making links with mathematics, science, and design and technology. The core of computing is computer science, in which pupils are taught the principles of information and computation, and how digital systems work. Computing equips pupils to use information technology to create programs, systems and a range of media. It also ensures that pupils become digitally literate – able to use, and express them-selves 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

The national curriculum for computing aims to ensure that all pupils:
. can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
. can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
. can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
. are responsible, competent, confident and creative users of information and communication technology.

Subject content for Key Stage 1

Pupils should be taught:
. 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
. use technology purposefully to create, organise, store, manipulate and retrieve digital content
. use technology safely and respectfully, keeping personal information private; know where to go for help and support when they have concerns about material on the internet
. recognise common uses of information technology beyond school.

Subject content for Key Stage 2

Pupils should be taught:
. design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
. use sequence, selection, and repetition in programs; work with variables and various forms of input and output
. use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
. understand computer networks including the internet; how they can provide multiple services, such as the world-wide web; and the opportunities they offer for communication and collaboration
. use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
. use technology safely, respectfully and responsibly; know a range of ways to report concerns and inappropriate behaviour
. select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information.

Attainment targets:

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Computing Long Term Plan

Year 1		Main focus of unit
Autumn 1	**Topic: Exploring machines we control.** ***Computer science- control and programming.*** • 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 • recognise common uses of information technology beyond school Children to use Beebots and Ozobots throughout this unit. *E- Safety Pause & Think Online - How can we be safe, responsible, and respectful online?*	*C.S.*
		I.T.
		D.L.
Autumn 2	**Topic: Programming direction.** ***Computer science control and programming.*** • 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 Focus on mazes and giving clear and unambiguous instructions. Debugging instructions to correct errors. *E-Safety Media Balance (well being) - How do we find a happy balance between our online and offline activities?*	C.S.
		I.T.
		D.L.
Spring 1	**Topic: Introduction to digital art.** ***IT and digital literacy- digital imagery, graphical modelling and art.*** • use technology purposefully to create, organise, store, manipulate and retrieve digital content. • recognise common uses of information technology beyond school. Use simple tools and compare art packages. Take and explore digital photographs. *E-Safety-Pause for People (media balance and wellbeing) -How do you say goodbye to technology when you don't want to?*	C.S.
		I.T.
		D.L

Spring 2	**Topic: Action algorithms.** *Computer science- computational thinking.* • 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 Explore a range of instructions to understand an algorithm is a precisely defined sequence of instructions or a set of rules for performing a specific task. *E-Safety- Internet Traffic Lights (Privacy and Security) - How do you stay safe when visiting a website or app?*	**C.S.**	
		I.T.	
		D.L.	
Summer 1	**Topic: Exploring digital sound.** *IT and digital literacy- sound.* • use technology purposefully to create, organise, store, manipulate and retrieve digital content • recognise common uses of information technology beyond school Explore and evaluate a range of different programs to produce digital sounds. *E-Safety- Self-Image and Identity: I can recognise that I can say 'no' 'please stop' 'I'll tell' 'I'll ask' to somebody who asks me to do something that makes me feel sad, embarrassed or upset.*	**C.S.**	
		I.T.	
		D.L.	
Summer 2	**Topic: Finding and presenting information.** *IT and digital literacy, information, data, the web and technology.* • use technology purposefully to create, organise, store, manipulate and retrieve digital content • 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 Using search engines online information. Create graphs and introduce concept of databases. *E-Safety-Health, Well-being and Lifestyle: I can identify rules that help keep us safe and healthy in and beyond the home when using technology.*	**C.S.**	
		I.T.	
		D.L.	

	Year 2	

Autumn 1	**Topic: Writing in Different Styles.** *I.T. and digital literacy. Text, graphics, multimedia and story-telling.* • use technology purposefully to create, organise, store, manipulate and retrieve digital content • recognise common uses of information technology beyond school. Introduce children to word processing and desktop publishing using a number of different tools and design tasks. *E-Safety: Pause & Think Online - How can we be safe, responsible, and respectful online?*	**C.S.** **I.T.** **D.L.**
Autumn 2	**Topic: Programming with Scratch Junior.** *Computer Science, Control and Programming.* • 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 • use technology purposefully to create, organise, store, manipulate and retrieve digital content. Use computer language to create animations and games. Write and de-bug algorithms, learn about repeating and different triggers to create actions. *E Safety: Safety in My Online Neighbourhood: How do you go places safely online?*	**C.S.** **I.T.** **D.L.**
Spring 1	**Topic: Beginning to Present.** *IT & Digital Literacy. Text, Graphics, Multimedia and Storytelling.* • use technology purposefully to create, organise, store, manipulate and retrieve digital content. • 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. Research and collect information on Healthy Eating. (Links to Science and D.T. Project) *E Safety: Device-Free Moments- Why is it important that we have device-free moments in our lives?.*	**C.S.** **I.T.** **D.L.**
Spring 2	**Topic: An Introduction To Animation** *I.T. & Digital Literacy. Animation and Video* . use technology purposefully to create, organise, store, manipulate and retrieve digital content. An introduction to animations. Understanding that animations are made up of a number of still images. Introduce 2D and stop frame animation and different tools for creating both. *E Safety: Privacy and Security I can explain what passwords are and can use passwords for my accounts and devices.*	**C.S.** **I.T** **D.L**

Summer 1	**Topic: Making Multimedia Stories** *IT & Digital Literacy. Text, Graphics, Multimedia and Storytelling.* • use technology purposefully to create, organise, store, manipulate and retrieve digital content. • recognise common uses of information technology beyond school. Write and create a story and bring it to life with sound and animation. *E Safety: That's Private!: What kinds of information should I keep to myself when I use the internet?*	**C.S.**
		I.T.
		D.L.
Summer 2	**Topic: All About Algorithms** *Computer Science Computational thinking* • 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. • recognise common uses of information technology beyond school. Build on previous programming work on direction. Look at other examples of sequencing activities for sequencing algorithms. Introduce building and programming with Lego WeDo. *E Safety: Privacy and Security I can describe the people I can trust and can share this with; I can explain why I can trust them.*	**C.S.**
		I.T.
		D.L.

Year 3	

Autumn 1	**Real life algorithms** **Real life algorithms** To understand what an algorithm is. Create a simple algorithm. Apply coding knowledge to create a sequence that can be followed from input to output. *E-Safety- Privacy and Security - I understand and can give reasons why passwords are important.*	**C.S.**
		I.T
		D.L.

Autumn 2	**Programming Scratch Maze – Using NT Computer planning Year 3** To understand and apply simple programming Be able to design and apply a simple programme to control and stimulate a physical system. To understand debugging and its effects on an algorithm. Build adventure maze games and design your own levels, characters and objects to collect. *E-Safety- Health, Well-being and Lifestyle - I can explain rules to keep us safe when we are using technology both in and beyond the home.*	**C.S.** **I.T** **D.L.**
Spring 1	**Databases** **Databases**- NT IT Database plans select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information Use of accessible programmes to show data Collect, present and evaluate data. *E-Safety- Health, Well-being and Lifestyle - I can explain why spending too much time using technology can sometimes have a negative impact*	**C.S.** **I.T** **D.L.**
Spring 2	**Lego-Wedo Controlling Machines- NT Computing Plan Year 3** **Lego-Wedo Controlling Machines** design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts use sequence, selection, and repetition in programs; work with variables and various forms of input and output use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs Children are introduced to various mechanisms used in fairground rides. They will consider how they are controlled and how they move. They will build various rides out of Technic Lego. Write and debug programs to control the rides. *E-Safety- Digital Trails - What info is it OK to have in your digital footprint?*	**C.S.** **I.T** **D.L.**
Summer 1	**Communication and collaboration- NT Computing plan Year 3** - understand computer networks including the internet; how they can provide multiple services, such as the world-wide web; and the opportunities they offer for communication and collaboration - use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content - use technology safely, respectfully and responsibly; know a range of ways to report concerns and inappropriate behaviour	**C.S.** **I.T**

	• Select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information. Understand and apply knowledge to Google docs *E-Safety- Let's Give Credit! How can you give credit for other people's work?*	**D.L.**

Summer 2	**Building Retro Games (Pac-Man)- NT Computing plan Y3** ● design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts ● use sequence, selection, and repetition in programs; work with variables and various forms of input and output ● use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs *A unit to extend understanding of Scratch Junior* *E-Safety-Self-Image and Identity - I can explain what is meant by the term 'identity'.*	**C.S.** **I.T.** **D.L.**

Year 4		
Autumn 1	**Searching the Web** *The content of this plan cover the following NC strands:* • *understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration* • ***use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content*** • *select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information* • *use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact* *E-Safety- Privacy and Security - I understand and can give reasons why passwords are important.*	**C.S.** **I.T.** **D.L.**
Autumn 2	**Getting Started with Kodu** *The content of this plan cover the following NC strands:* • *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* *E-Safety- Health, Well-being and Lifestyle -I can explain simple guidance for using technology in different environments and settings.*	**C.S.** **I.T.** **D.L.**
Spring 1	**Programming Robots- Lego NXT** *The content of this plan cover the following NC strands:* • *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* *E-Safety- Privacy and Security - I can explain how internet use can be monitored.*	**C.S.** **I.T.** **D.L.**

Spring 2	**Digital imagery: Patterns in nature**	**C.S.**
		I.T.
	The content of this plan cover the following NC strands: • *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*	
		D.L.
	E-Safety- Health, Well-being and Lifestyle - I can identify times or situations when I might need to limit the amount of time I use technology.	
Summer 1	**Manipulating Sound**	**C.S.**
	The content of this plan cover the following NC strands: • *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*	**I.T.**
	E-Safety- Putting a stop to online meanness - what should you do if someone is mean to you online?	**D.L.**
Summer 2	**Computational Thinking – Alien Contact!**	**C.S.**
	The content of this plan cover the following NC strands: • *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*	**I.T.**
	E-Safety- Be a super digital citizen - How can we be upstanders when we see cyberbullying?	**D.L.**