Computing Curriculum Overview

Chadsmead Primary Academy – Computing Curriculum Overview

Computing in Early Years

Despite computing not being explicitly mentioned within the Early Years Foundation Stage (EYFS) statutory framework, which focuses on the learning and development of children from birth to age five, there are many opportunities for our children to use technology to solve problems and produce creative outcomes.
Our children are taught the skills through adult-led activities which enables them to use technology freely in the continuous provision.

Examples of technology used include:

- BeeBots
- iPads
- remote control vehicles
- interactive screen
- torches
- cameras
- Code-a-pillar

The children then use this technology to:

- take a photograph with a camera or tablet
- search for information on the internet with an adult
- play games on the interactive screen
- explore mechanical toys
- direct a Beebot
- watch video clips
- listen to music

Allowing children the opportunity to explore technology in this carefree and often child-led way, means that not only will they develop a familiarity with equipment and vocabulary but they will have a strong start in Key Stage 1 Computing and all that it demands.

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		Autumn 1	Spring 1	Summer 1
Y1/2	**Cycle A (2022/23)**	**Computing Systems & Networks: Technology Around Us**	**Creating Media: Digital Writing**	**Data & Information: Grouping Data**
		National Curriculum Links: **KS1 Computing:** • **Recognise common uses of information technology beyond school;** • **Use technology purposefully to create, organise, store, manipulate, and retrieve digital content.** In this unit, we will develop our understanding of technology and how it can help us. We will start to become familiar with the different components of a computer by developing our keyboard and mouse skills. We will also consider how to use technology responsibly.	**National Curriculum Links:** **KS1 Computing:** ● **Use technology purposefully to create, organise, store, manipulate and retrieve digital content** ● **Use technology safely and respectfully, keeping personal information private** During this unit, we will develop our understanding of the various aspects of using a computer to create and manipulate text. We will become more familiar with using a keyboard and mouse to enter and remove text. We will also consider how to change the look of their text, and will be able to justify our reasoning in making these changes.	**National Curriculum Links:** **KS1 Computing:** ● **Use technology purposefully to create, organise, store, manipulate, and retrieve digital content** ● **Use technology safely and respectfully** In this unit, we are introduced to data and information. Labelling, grouping, and searching are important aspects of data and information. Searching is a common operation in many applications, and requires an understanding that to search data, it must have labels. This unit of work focuses on assigning data (images) with different labels in order to demonstrate how computers are able to group and present data.
		Autumn 2	**Spring 2**	**Summer 2**
		Creating Media: Digital Painting	**Programming A: Moving Robots**	**Programming B: Introduction to Animation**
		National Curriculum Links: **KS1 Computing:** ● **Use technology purposefully to create, organise, store, manipulate, and retrieve digital content** We will develop our understanding of a range of tools used for digital painting. We will then use these tools to create our own digital paintings, while gaining inspiration from a range of artists' work.	**National Curriculum Links:** **KS1 Computing:** ● **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** We will be introduced to early programming concepts and explore using individual commands, both with others and as part of a computer program. We will identify what each command for the floor robot does, and use that knowledge to start predicting the outcome of programs. We are also introduced to the early stages of program design through the introduction of algorithms.	**National Curriculum Links:** **KS1 Computing:** ● **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** We will be introduced to on-screen programming through ScratchJr. We will explore the way a project looks by investigating sprites and backgrounds and will use programming blocks to use, modify, and create programs. We will continue to learn to create algorithms.

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		Autumn 1	Spring 1	Summer 1
Y1/2	**Cycle B (2023/24)**	**Computing Systems and Networks: IT Around Us** National Curriculum Links: **KS1 Computing:** • **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.** We will develop our understanding of what information technology (IT) is and will begin to identify examples. We will discuss where we have seen IT in school and beyond, in settings such as shops, hospitals, and libraries. We will then investigate how IT improves our world and learn about the importance of using IT responsibly.	**Creating Media: Digital Photography** National Curriculum Links: **KS1 Computing:** • **Use technology purposefully to create, organise, store, manipulate, and retrieve digital content** Through the lessons in this unit, we will learn to recognise that different devices can be used to capture photographs and will gain experience capturing, editing, and improving photos. Finally, we will use this knowledge to recognise that images we see may not be real.	**Data and Information: Pictograms** National Curriculum Links: **KS1 Computing:** • **Use technology purposefully to create, organise, store, manipulate and retrieve digital content** • **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** This unit introduces the us to the term 'data'. We will begin to understand what data means and how this can be collected in the form of a tally chart. We will learn the term 'attribute' and use this to help us organise data. We will then progress onto presenting data in the form of pictograms and finally block diagrams. We will then use the data presented to answer questions.
		Autumn 2	Spring 2	Summer 2
		Creating Media: Making Music National Curriculum Links: **KS1 Computing:** • **Use technology purposefully to create, organise, store, manipulate and retrieve digital content.** **KS1 Music:** • **Play tuned and untuned instruments musically** • **Listen with concentration and understanding to a range of high-quality live and recorded music** • **Experiment with, create, select and combine sounds using the inter-related dimensions of music.** In this unit, we will be using a computer to create music. We will listen to a variety of pieces of music and consider how music can make us think and feel. We will compare creating music digitally and non-digitally. We will look at patterns and purposefully create music.	**Programming A: Robot Algorithms** National Curriculum Links: **KS1 Computing:** • **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** This unit develops our understanding of instructions in sequences and the use of logical reasoning to predict outcomes. We will use given commands in different orders to investigate how the order affects the outcome. We will also learn about design in programming. We will develop artwork and test it for use in a program. We will design algorithms and then test those algorithms as programs and debug them.	**Programming B: An Introduction to Quizzes** National Curriculum Links: **KS1 Computing:** • **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** We begin to understand that sequences of commands have an outcome and make predictions based on our learning. We use and modify designs to create our own quiz questions in ScratchJr and realise these designs in ScratchJr using blocks of code. Finally, we evaluate we work and make improvements to our programming projects.

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		Autumn 1	Spring 1	Summer 1
Y3/4	**Cycle A (2022/23)**	**Computing Systems & Networks: Connecting Computers**	**Creating Media: Desktop Publishing**	**Data & Information: Branching Databases**
		National Curriculum Links: **KS2 Computing:** • **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** During this unit, we develop our understanding of digital devices, with an initial focus on inputs, processes, and outputs. We also compare digital and non-digital devices. Following this, we are introduced to computer networks, including devices that make up a network's infrastructure, such as wireless access points and switches. The unit concludes with us discovering the benefits of connecting devices in a network.	**National Curriculum Links:** **KS2 Computing:** • **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** We will use desktop publishing software and consider careful choices of font size, colour and type to edit and improve premade documents. We will be introduced to the terms 'templates', 'orientation', and 'placeholders' and begin to understand how these can support us in making our own template for a magazine front cover.	**National Curriculum Links:** **KS2 Computing:** • **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** We will develop our understanding of what a branching database is and how to create one. We will use yes/no questions to gain an understanding of what attributes are and how to use them to sort groups of objects. We will create physical and on-screen branching databases. To conclude the unit, we will create an identification tool using a branching database, which we will test by using it. We will also consider real-world applications for branching databases.
		Autumn 2	**Spring 2**	**Summer 2**
		Creating Media: Animation	**Programming A: Sequence in Music**	**Programming B: Events and Actions**
		National Curriculum Links: **KS2 Computing:** • **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.** We will use a range of techniques to create a stop-frame animation using tablets. Next, we will apply those skills to create a story-based animation. We will add other types of media to our animation, such as music and text.	**National Curriculum Links:** **KS2 Computing:** • **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** • **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** This unit explores the concept of sequencing in programming through Scratch. We will be introduced to a selection of motion, sound, and event blocks which we will use to create our own programs, featuring sequences. The final project is to make a representation of a piano. The unit is paced to focus on all aspects of sequences, and make sure that knowledge is built in a structured manner. We also apply stages of program design through this unit.	**National Curriculum Links:** **KS2 Computing:** • **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** • **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** This unit explores the links between events and actions, while consolidating prior learning relating to sequencing. We begin by moving a sprite in four directions (up, down, left, and right). We then explore movement within the context of a maze, using design to choose an appropriately sized sprite. This unit also introduces programming extensions, through the use of Pen blocks. We are given the opportunity to draw lines with sprites and change the size and colour of lines. The unit concludes with us designing and coding our own maze-tracing program.

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		Autumn 1	Spring 1	Summer 1
Y3/4	**Cycle B (2023/24)**	**Computing Systems and Networks: The Internet**	**Creating Media: Photo Editing**	**Data and Information: Data Logging**
		National Curriculum Links: KS2 Computing: • **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** During this unit we will apply our knowledge and understanding of networks, to appreciate the internet as a network of networks which need to be kept secure. We will learn that the World Wide Web is part of the internet, and be given opportunities to explore the World Wide Web for ourselves to learn about who owns content and what they can access, add, and create. Finally we will evaluate online content to decide how honest, accurate, or reliable it is, and understand the consequences of false information.	National Curriculum Links: KS2 Computing: • **Use search technologies effectively** • **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** In this unit, we will develop our understanding of how digital images can be changed and edited, and how they can then be resaved and reused. We will consider the impact that editing images can have, and evaluate the effectiveness of our choices.	National Curriculum Links: Computing – Key stage 2 • **...work with various forms of input** • **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** In this unit, we will consider how and why data is collected over time. We will consider the senses that humans use to experience the environment and how computers can use special input devices called sensors to monitor the environment. We will collect data as well as access data captured over long periods of time. We will look at data points, data sets, and logging intervals. We will spend time using a computer to review and analyse data. Towards the end of the unit, we will pose questions and then use data loggers to automatically collect the data needed to answer those questions.
		Autumn 2	**Spring 2**	**Summer 2**
		Creating Media: Audio Editing	**Programming A: Repetition in Shapes**	**Programming B: Repetition in Games**
		National Curriculum Links: KS2 Computing: • **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** In this unit, we will initially examine devices capable of recording digital audio, which will include identifying the input device (microphone) and output devices (speaker or headphones). We will discuss the ownership of digital audio and the copyright implications of duplicating the work of others. In order to record audio ourselves, we will use Audacity to produce a podcast, which will include editing our work, adding multiple tracks, and opening and saving the audio files. Finally, we will evaluate our work and give feedback to our peers.	National Curriculum Links: KS2 Computing: • **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** This unit is the first of the two programming units in Year 4, and looks at repetition and loops within programming. We will create programs by planning, modifying, and testing commands to create shapes and patterns. We will use Logo, a text-based programming language.	National Curriculum Links: KS2 Computing: • **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** This unit explores the concept of repetition in programming using the Scratch environment. It begins with a Scratch activity similar to that carried out in Logo in Programming unit A, where we can discover similarities between two environments. We look at the difference between count-controlled and infinite loops, and use our knowledge to modify existing animations and games using repetition. Our final project is to design and create a game which uses repetition, applying stages of programming design throughout.

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		Autumn 1	Spring 1	Summer 1
Y5/6	**Cycle A (2022/23)**	**Computing Systems and Networks: Systems and Searching**	**Creating Media: Video Editing**	**Data and Information: Flat-File Databases**
		National Curriculum Links: **KS2 Computing:** • **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** We will develop our understanding of computer systems and how information is transferred between systems and devices. We will consider small-scale systems as well as large-scale systems. We explain the input, output, and process aspects of a variety of different real-world systems. We discover how information is found on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines.	**National Curriculum Links:** **KS2 Computing:** • **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** We will learn how to create short videos by working in pairs or groups. As we progress through this unit, we will be exposed to topic-based language and develop the skills of capturing, editing, and manipulating video. We are guided with step-by-step support to take our idea from conception to completion. At the conclusion of the unit, we have the opportunity to reflect on and assess our progress in creating a video.	**National Curriculum Links:** **KS2 Computing:** • **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** This unit looks at how a flat-file database can be used to organise data in records. We will use tools within a database to order and answer questions about data. We will create graphs and charts from our data to help solve problems. We will also use a real-life database to answer a question, and present our work to others.
		Autumn 2	**Spring 2**	**Summer 2**
		Creating Media: Vector Drawing	**Programming A: Selection in Physical Computing**	**Programming B: Selection in Quizzes**
		National Curriculum Links: **KS2 Computing:** • **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.** In this unit, we start to create vector drawings. They learn how to use different drawing tools to help them create images. We recognise that images in vector drawings are created using shapes and lines, and each individual element in the drawing is called an object. We layer our objects and begin grouping and duplicating them to support the creation of more complex pieces of work.	**National Curriculum Links:** **KS2 Computing:** • **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** • **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** In this unit, we will use physical computing to explore the concept of selection in programming through the use of the Crumble programming environment. We 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). We will be introduced to conditions as a means of controlling the flow of actions in a program. We will make use of our knowledge of repetition and conditions when introduced to the concept of selection (through the 'if...then...' structure) and write algorithms and programs that utilise this concept. To conclude the unit, we will design and make a working model of a fairground carousel that will demonstrate their understanding of how the microcontroller and its components are connected, and how selection can be used to control the operation of the model.	**National Curriculum Links:** **KS2 Computing:** • **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** • **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** We will develop our 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'. We represent this understanding in algorithms, and then by constructing programs in the Scratch programming environment. We learn how to write programs that ask questions and use selection to control the outcomes based on the answers given. We use this knowledge to design a quiz in response to a given task and implement it as a program. To conclude the unit, we will evaluate our program by identifying how it meets the requirements of the task, the ways we have improved it, and further ways it could be improved.

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		Autumn 1	Spring 1	Summer 1
Y5/6	**Cycle B (2023/24)**	**Computing Systems and Networks: Communication** **National Curriculum Links:** **KS2 Computing:** • **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** • **Select, use and combine a variety of software (including internet services) on a range of digital devices** • **Use technology safely, respectfully and responsibly;** In this unit, the class will learn about the World Wide Web as a communication tool. First, we will learn how we find information on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines. We will then investigate different methods of communication, before focusing on internet-based communication. Finally, we will evaluate which methods of internet communication to use for particular purposes.	**Creating Media: 3D Modelling** **National Curriculum Links:** **KS2 Computing:** • **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** During this unit, we will develop our knowledge and understanding of using a computer to produce 3D models. We will initially familiarise ourselves with working in a 3D space, including combining 3D objects to make a house and examining the differences between working digitally with 2D and 3D graphics. We will progress to making accurate 3D models of physical objects, such as a pencil holder, which include using 3D objects as placeholders. Finally, we will examine the need to group 3D objects, then go on to plan, develop, and evaluate our own 3D model of a photo frame.	**Data and Information: Spreadsheets** **National Curriculum Links:** **KS2 Computing:** • **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** This unit introduces us to spreadsheets. We are supported in organising data into columns and rows to create our own data set. We are taught the importance of formatting data to support calculations. We are introduced to formulas and begin to understand how these can be used to produce calculated data. We are taught how to apply formulas which include a range of cells and apply formulas to multiple cells by duplicating them. We will use spreadsheets to plan an event and answer questions. Finally we create graphs and charts and evaluate our results in comparison to questions asked.
		Autumn 2	Spring 2	Summer 2
		Creating Media: Web Page Creation **National Curriculum Links:** **KS2 Computing:** • **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.** This unit introduces us to the creation of websites for a chosen purpose. We will identify what makes a good web page and use this information to design and evaluate their own website using Microsoft Sway. Throughout the process, we will pay specific attention to copyright and fair use of media, the aesthetics of the site, and navigation paths.	**Programming A: Variables in Games** **National Curriculum Links:** **KS2 Computing:** • **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 program.** This unit explores the concept of variables in programming through games in Scratch. First, we will learn what variables are, and relate them to real-world examples of values that can be set and changed. We will then use variables to create a simulation of a scoreboard. In Lessons 2, 3, and 5, which follow the Use-Modify-Create model, we will experiment with variables in an existing project, then modify them, then we will create our own project. In Lesson 4, we will focus on design. Finally, in Lesson 6, we will apply our knowledge of variables and design to improve our game in Scratch.	**Programming B: Sensing** **National Curriculum Links:** **KS2 Computing:** • **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** This unit brings together elements of all the four programming constructs: sequence and repetition from years 3/4, selection and variables, from years 5/6. It offers pupils the opportunity to use all of these constructs in a different, but still familiar environment whilst also utilising a physical device - the micro:bit. The unit begins with a simple program which we build in and test in the programming environment before transferring it to our micro:bit. We then take on three new projects in lessons 2, 3 and 4, with each lesson adding more depth. Design features prominently in this unit. A design template is introduced in lesson 3, initially scaffolded to give us the opportunity to create code from a given design. In lesson 4 that scaffolding is gradually reduced, then in lesson 5, we create our own design, using the same template. In the final lesson, we will apply our knowledge of the programming constructs and use our design to create our own micro:bit based step counter