Computing Curriculum Folder
2022

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Core Curriculum intent

At Lugwardine Primary Academy we develop children as resilient learners who have the knowledge, understanding and skills to be responsible and effective members of their community.

The curriculum we teach will enable our learners to be confident members of both their local community and the wider world. The children will leave Lugwardine Primary passionate about their beliefs and equipped with the knowledge and skills they need to achieve their full potential.

Our curriculum is designed to inspire, support and include. We believe that by developing the whole child, pupils will learn to transfer the skills and knowledge across different settings and circumstances. We believe all children benefit from a range of learning opportunities and seek to develop their experiences both inside and outside the classroom.

Subject Intent

At lugwardine Primary Academy it is our intention to recognise the importance of technology in every aspect of daily life. For most of us, technology is essential to our lives, at home and at work. 'Computational Thinking' is a key skill that children must learn well if they are to be ready for the workplace and able to participate effectively in this digital world. At the core of our curriculum is computer science, in which pupils are taught the principles of coding, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, we intend for our children to use information technology to create programs and systems for a range of contexts. We aim to ensure that pupils become digitally literate to express themselves and develop their ideas through, information and communication technology, in order for them to be active participants in a digital world.

Subject Implementation

Curriculum

Computing at Lugwardine Primary Academy is taught through discrete lessons. Our scheme of work for Computing is adapted from the 'Teach Computing' Curriculum and covers all aspects of the National Curriculum. This scheme was chosen as it has been created by subject experts and based on the latest pedagogical research. We teach computing skills in a carefully planned progression over yearly learning blocks; each block building on the previous one. We separate the computing curriculum into 6 blocks (Computing systems and networks, Creating media 1, Programming A, Data and information, Creating media 2 and Programming B). Teachers use and adapt this planning to fit the needs of our learners, to ensure they are well prepared to communicate and apply their skills effectively across a wide range of subjects, media and platforms as they progress throughout the school.

Online safety.

A key part of implementing our computing curriculum is to ensure that safety of our pupils is paramount. We take online safety very seriously and we aim to give children the necessary skills to keep themselves safe online. Children have a right to enjoy childhood online, to access safe online spaces and to benefit from all the opportunities that a connected world can bring them, appropriate to their age and stage.

Children build online resilience throughout our Jigsaw PSHE scheme which is closely aligned to the Education for a Connected World' framework. Online safety is also promoted and modelled through our computing lessons. In addition, the children at Lugwardine Primary Academy are taught about 4 C's of online safety (Content, contact, conduct and commerce) each year. These 4cs are displayed around the school and the children sign an agreement each year that they will follow these rules.

Hardware

In order to implement our curriculum children at Lugwardine Primary Academy have access to a range of hardware including iPads, laptops, Lego WeDo, Beebots and programable cars. Teachers also have access to additional iPads, desktop PCs and interactive whiteboards in each class.

Subject Impact

Within Computing, we encourage a creative and collaborative environment in which pupils can learn to express and challenge themselves. The success of the curriculum itself will be monitored through lesson observations and teacher audits. This will then inform future adaptions of the scheme of work and help to ensure that progression is evident throughout school.

In order to demonstrate that we have accomplished our aims, pupils at Lugwardine Primary Academy should:

•Be enthusiastic and confident in their approach towards Computing.

•Present as competent and adaptable 'Computational Thinkers' who are able to use identified concepts and approaches in all of their learning.

•Be able to identify the source of problems and work with perseverance to 'debug' them.

•Create and evaluate their own project work.

•Have a secure understanding of the positive applications and specific risks associated with a broad range of digital technology.

•Transition to secondary school with a keen interest in the continued learning of this subject.

Golden threads

Children will understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation.

Computational thinking (Concepts and Approaches)

Children can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems.

Children can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems.

Computing systems

Children are responsible, competent, confident and creative users of information and communication technology.

Online safety (4 Cs)

Long term plan

	Computing systems and networks	Creating media	Programming A	Data and information	Creating media	Programming B
Year 1	Technology around us	Digital painting	Moving a robot	Grouping data	Digital writing	Programming animations
Year 2	Information technology around us	Digital photography	Robot algorithms	Pictograms	Making music	Programming quizzes
Year 3	Connecting computers	Stop-frame animation	Sequencing sounds	Branching databases	Desktop publishing	Events and actions in programs
Year 4	The internet	Audio editing	Repetition in shapes	Data logging**	Photo editing	Repetition in games
Year 5	Sharing information	Video editing	Selection in physical computing*	Flat -file databases	Vector drawing	Selection in quizzes
Year 6	Internet communication	Webpage creation	Variables in games	Introduction to spreadsheets	3D modelling	Sensing*

* To use Lego WeDo in UKS2 instead of crumble controllers. Use a unit of work in the lego WeDo app. We will be investing in crumble controllers in the future and moving WeDo to LKS2.
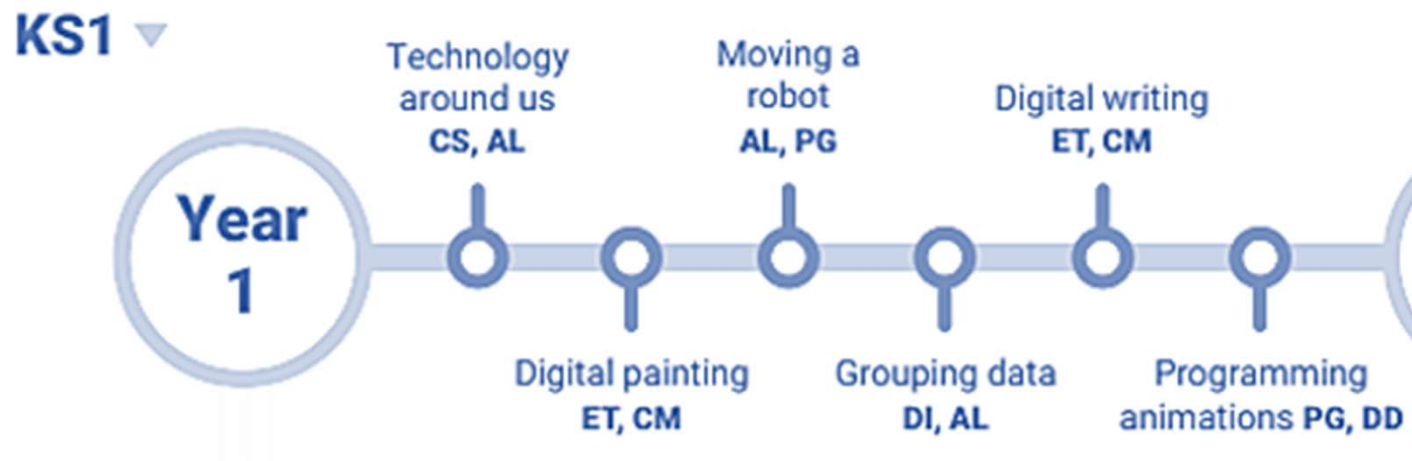
**Unit subject to change due to current hardware. School only has 1 data logger.

Computing Progression Map
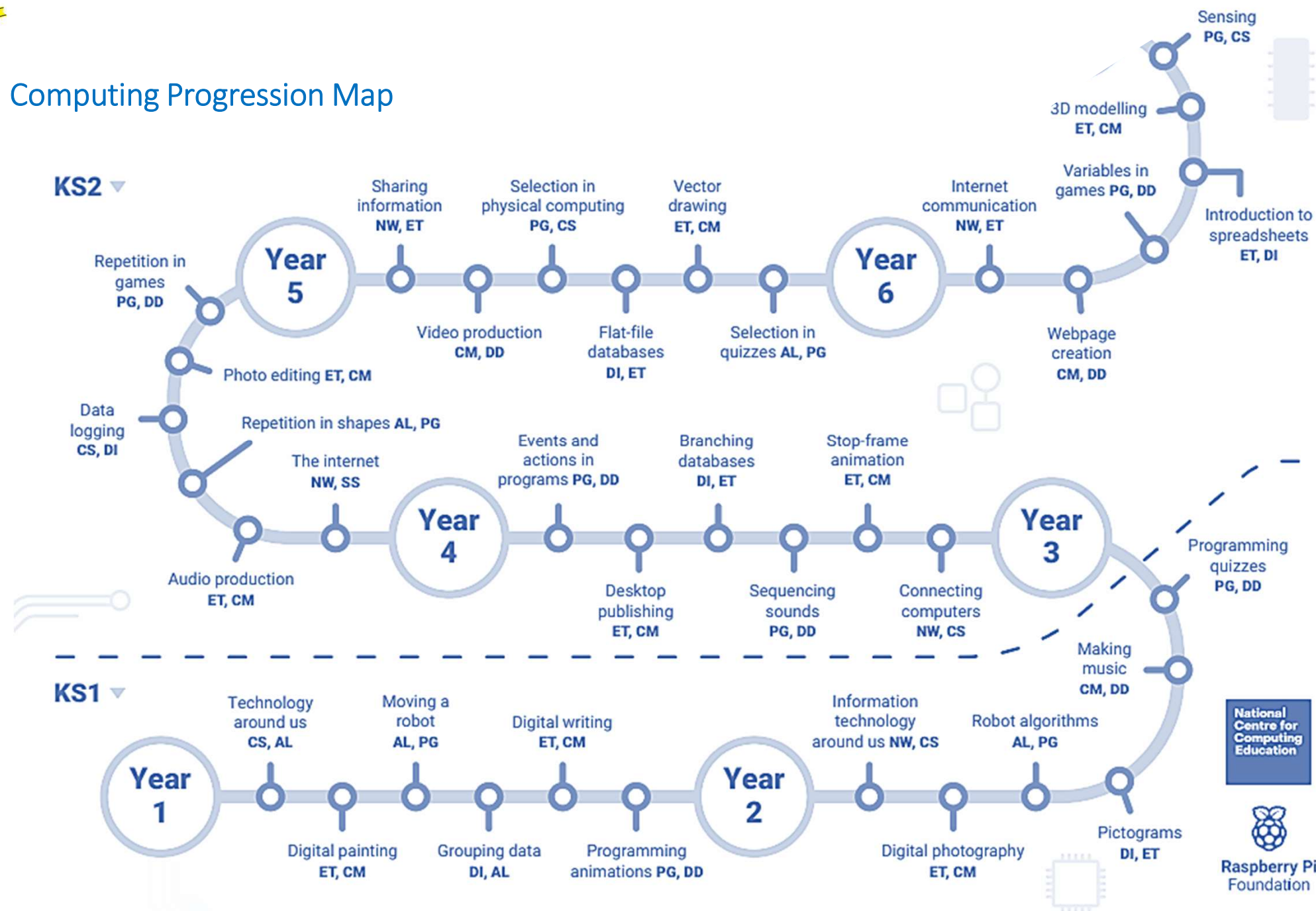
Curriculum offer – Year 1

Curriculum offer

Year 1 – Technology around us

Develop your learners' understanding of technology and how it can help them. They will become more familiar with the different components of a computer by developing their keyboard and mouse skills, and also start to consider how to use technology responsibly.

Lesson	Brief overview	Learning objectives
1 Technology around us	Learners will become familiar with the term 'technology'. They will classify what is and what is not technology in their school and/or classroom. Learners will demonstrate their understanding of how technology helps us in different ways.	**To identify technology** • I can explain technology as something that helps us • I can locate examples of technology in the classroom • I can explain how these technology examples help us
2 Using technology	Learners will get to know the main parts of a desktop or laptop computer. They will practise turning on and logging in to a computer. The learners will apply their knowledge of the different parts of a computer, to complete a mouse-based task.	**To identify a computer and its main parts** • I can name the main parts of a computer • I can switch on and log into a computer • I can use a mouse to click and drag
3 Developing mouse skills	Learners will be building on the mouse skills they were introduced to in Lesson 2. Learners will review images of a computer to explain what each part does. They will develop an understanding that different computers use different mice, but they perform the same function. They will use the mouse to open a program and create a simple picture.	**To use a mouse in different ways** • I can use a mouse to open a program • I can click and drag to make objects on a screen • I can use a mouse to create a picture
4 Using a computer keyboard	Learners will begin to use the computer keyboard for a purpose. They should understand that writing on a keyboard is called typing and will begin to demonstrate their ability to write their name. Learners will then save their work using the save icon and understand that this icon is used in lots of different programs.	**To use a keyboard to type on a computer** • I can say what a keyboard is for • I can type my name on a computer • I can save my work to a file
5 Developing keyboard skills	Learners will begin by opening a file they have previously created. They will demonstrate their ability to use a keyboard to edit text, by writing a sentence and then deleting letters. They will also use the keyboard arrow keys to move the text cursor in their textbox.	**To use the keyboard to edit text** • I can open my work from a file • I can use the arrow keys to move the cursor • I can delete letters
6 Using a computer responsibly	Learners will be introduced to the concept of using computers safely, within the context of a school setting. They will explore why we have rules in school and how those rules help us, and then apply this understanding to rules needed for using computer technology safely.	**To create rules for using technology responsibly** • I can identify rules to keep us safe and healthy when we are using technology in and beyond the home • I can give examples of some of these rules • I can discuss how we benefit from these rules

Curriculum offer

Year 1 – Creating media – Digital painting

Learners will develop their understanding of a range of tools used for digital painting. They then use these tools to create their own digital paintings, while gaining inspiration from a range of artists' work. The unit concludes with learners considering their preferences when painting with and without the use of digital devices.

Lesson	Brief overview	Learning objectives
1 How can we paint using computers?	This lesson introduces learners to the freehand tools available for digital painting.	To describe what different freehand tools do • I can make marks on a screen and explain which tools I used • I can draw lines on a screen and explain which tools I used • I can use the paint tools to draw a picture
2 Using shape and lines	This lesson introduces learners to the line and shape tools and revisits the fill and undo tools used for digital painting. Learners create their own digital painting in the style of an artist.	To use the shape tool and the line tools • I can make marks with the square and line tools • I can use the shape and line tools effectively • I can use the shape and line tools to recreate the work of an artist
3 Making careful choices	This lesson introduces learners to a range of shape tools, allowing them to create a painting in the style of an artist.	To make careful choices when painting a digital picture • I can choose appropriate shapes • I can make appropriate colour choices • I can create a picture in the style of an artist
4 Why did I choose that?	This lesson increases learners' understanding of the available paint tools and encourages them to select the best tools to create a digital painting in the style of Wassily Kandinsky.	To explain why I chose the tools I used • I can explain that different paint tools do different jobs • I can choose appropriate paint tools and colours to recreate the work of an artist • I can say which tools were helpful and why
5 Painting all by myself	Learners select appropriate colours, brush sizes, and brush tools to independently create their own image in the style of an artist.	To use a computer on my own to paint a picture • I can make dots of colour on the page • I can change the colour and brush sizes • I can use dots of colour to create a picture in the style of an artist on my own
6 Comparing computer art and painting	Learners compare their preferences when creating paintings on computers and on paper.	To compare painting a picture on a computer and on paper • I can explain that pictures can be made in lots of different ways • I can spot the differences between painting on a computer and on paper • I can say whether I prefer painting using a computer or using paper

Curriculum offer

Year 1 – Programming A – Moving a robot

Learners will be introduced to early programming concepts. Learners will explore using individual commands, both with other learners and as part of a computer program. They will identify what each command for the floor robot does, and use that knowledge to start predicting the outcome of programs. The unit is paced to ensure time is spent on all aspects of programming, and builds knowledge in a structured manner. Learners are also introduced to the early stages of program design through the introduction of algorithms.

Lesson	Brief overview	Learning objectives
1 Buttons	Learners will be introduced to floor robots. They will talk about what the buttons on a floor robot might do and then try the buttons out. They will spend time linking an outcome to a button press. Learners will consider the direction command buttons, as well as the 'clear memory' and 'run program' buttons.	To explain what a given command will do • I can predict the outcome of a command on a device • I can match a command to an outcome • I can run a command on a device
2 Directions	Learners will think about the language used to give directions and how precise it needs to be. They will also work with a partner to give and follow instructions. These real-world activities should, at suitable points during this lesson, be related to the floor robot introduced in Lesson 1.	To act out a given word • I can follow an instruction • I can recall words that can be acted out • I can give directions
3 Forwards and backwards	Learners will focus on programming the floor robot to move forwards and backwards. They will see that the robot moves forwards and backwards a fixed distance. This highlights the idea that robots follow a clear, fixed command in a precise and repeatable way. Learners will think about starting the robot from the same place each time. Using the same starting position with fixed commands will allow learners to predict what a program will do. **Note:** This lesson focuses specifically on forward and backward movement only. This is to ensure that learners are developing a depth of knowledge in the concepts surrounding programming, as well as developing their ability to make the robot move. The success criteria for this lesson highlight this and ensure that the learners' knowledge is built in a suitably paced way.	To combine 'forwards' and 'backwards' commands to make a sequence • I can compare forward and backward movements • I can start a sequence from the same place • I can predict the outcome of a sequence involving 'forwards' and 'backwards' commands
4 Four directions	Learners will use 'left turn' and 'right turn' commands along with 'forwards' and 'backwards' commands. Doing this will allow learners to develop slightly more complex programs. Learners will create their programs in this lesson through trial and error, before moving on to planning out their programs in Lesson 5. In Activity 3, learners will predict where given programs will move the robot to. Learners will make their predictions by looking at the commands and matching the program steps to movements.	To combine four direction commands to make sequences • I can compare left and right turns • I can experiment with 'turn' and 'move' commands to move a robot • I can predict the outcome of a sequence involving up to four commands
5 Getting there	Learners will decide what their program will do. They will then create their program and test it on the robot. Where needed, learners will also debug their program.	To plan a simple program • I can explain what my program should do • I can choose the order of commands in a sequence • I can debug my program
6 Routes	Learners will be encouraged to plan routes around a mat before they start to write programs for those routes. The activities in this lesson also introduce the concept of there being more than one way to solve a problem. This concept is valid for a lot of programming activities: the same outcome can be achieved through a number of different approaches, and there is not necessarily a 'right' approach. The lesson also introduces the idea of program design, where learners need to plan what they want their program to achieve before they start programming.	To find more than one solution to a problem • I can identify several possible solutions • I can plan two programs • I can use two different programs to get to the same place

Curriculum offer

Year 1 – Grouping data

This unit introduces learners 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.

During this unit, learners will be logging on to the computers, opening their documents, and saving their documents. Depending on how your school's system is set up, additional support and time may be required to facilitate these steps, and consideration should be given as to how this will impact the timings of activities in each lesson.

Lesson	Brief overview	Learning objectives
1 Label and match	Learners will begin to understand that objects have many different labels that can be used to put them into groups. They will name different objects and begin to experiment with placing them into different groups. Learners will also label a group of objects, and begin to understand that an object can fit into more than one group depending on the context.	To label objects • I can describe objects using labels • I can match objects to groups • I can identify the label for a group of objects
2 Group and count	Learners will begin to think about grouping objects based on what the objects are. They will demonstrate the ability to count a small number of objects before they group them, and will then begin to show that they can count groups of objects with the same label. Learners will also begin to learn that computers are not intelligent, and require input from humans to perform tasks.	To identify that objects can be counted • I can count objects • I can group objects • I can count a group of objects
3 Describe an object	Learners will begin to understand that objects can be described in many different ways. They will identify the properties of objects and begin to understand that properties can be used to group objects; for example, objects can be grouped by colour or size. Finally, learners will demonstrate their ability to find objects with similar properties and begin to understand the reason that we need to give labels to images on a computer.	To describe objects in different ways • I can describe an object • I can describe a property of an object • I can find objects with similar properties
4 Making different groups	Learners will classify objects based on their properties. They will group objects that have similar properties, and will be able to explain how they have grouped these. Learners will begin to group a number of the same objects in different ways, and will demonstrate their ability to count these different groups.	To count objects with the same properties • I can group similar objects • I can group objects in more than one way • I can count how many objects share a property
5 Comparing groups	Learners will choose how they want to group different objects by properties. They will begin to compare and describe groups of objects, then they will record the number of objects in each group.	To compare groups of objects • I can choose how to group objects • I can describe groups of objects • I can record how many objects are in a group
6 Answering questions	Learners will decide how to group objects to answer questions. They will compare their groups by thinking about how they are similar or different, and they will record what they find. They will then share what they have found with their peers.	To answer questions about groups of objects • I can decide how to group objects to answer a question • I can compare groups of objects • I can record and share what I have found

Curriculum offer

Year 1 – Creating media – Digital writing

Learners will develop their understanding of the various aspects of using a computer to create and manipulate text. They will become more familiar with using a keyboard and mouse to enter and remove text. Learners will also consider how to change the look of their text, and will be able to justify their reasoning in making these changes. Finally, learners will consider the differences between using a computer to create text, and writing text on paper. They will be able to explain which method they prefer and explain their reasoning for choosing this.

| Lesson	Brief overview	Learning objectives
1 Label and match	Learners will begin to understand that objects have many different labels that can be used to put them into groups. They will name different objects and begin to experiment with placing them into different groups. Learners will also label a group of objects, and begin to understand that an object can fit into more than one group depending on the context.	To label objects • I can describe objects using labels • I can match objects to groups • I can identify the label for a group of objects
2 Group and count	Learners will begin to think about grouping objects based on what the objects are. They will demonstrate the ability to count a small number of objects before they group them, and will then begin to show that they can count groups of objects with the same label. Learners will also begin to learn that computers are not intelligent, and require input from humans to perform tasks.	To identify that objects can be counted • I can count objects • I can group objects • I can count a group of objects
3 Describe an object	Learners will begin to understand that objects can be described in many different ways. They will identify the properties of objects and begin to understand that properties can be used to group objects; for example, objects can be grouped by colour or size. Finally, learners will demonstrate their ability to find objects with similar properties and begin to understand the reason that we need to give labels to images on a computer.	To describe objects in different ways • I can describe an object • I can describe a property of an object • I can find objects with similar properties
4 Making different groups	Learners will classify objects based on their properties. They will group objects that have similar properties, and will be able to explain how they have grouped these. Learners will begin to group a number of the same objects in different ways, and will demonstrate their ability to count these different groups.	To count objects with the same properties • I can group similar objects • I can group objects in more than one way • I can count how many objects share a property
5 Comparing groups	Learners will choose how they want to group different objects by properties. They will begin to compare and describe groups of objects, then they will record the number of objects in each group.	To compare groups of objects • I can choose how to group objects • I can describe groups of objects • I can record how many objects are in a group
6 Answering questions	Learners will decide how to group objects to answer questions. They will compare their groups by thinking about how they are similar or different, and they will record what they find. They will then share what they have found with their peers.	To answer questions about groups of objects • I can decide how to group objects to answer a question • I can compare groups of objects • I can record and share what I have found

Curriculum offer

Year 1 – Programming B – Programming animations

Learners will be introduced to on-screen programming through ScratchJr. Learners will explore the way a project looks by investigating sprites and backgrounds. They will use programming blocks to use, modify, and create programs. Learners will also be introduced to the early stages of program design through the introduction of algorithms.

Lesson	Brief overview	Learning objectives
1 Comparing tools	During this lesson learners will become accustomed to the ScratchJr programming environment. They will discover that they can move characters on-screen using commands, and compare ScratchJr to the Bee-Bots used in the previous unit.	To choose a command for a given purpose • I can find the commands to move a sprite • I can use commands to move a sprite • I can compare different programming tools
2 Joining blocks	During this lesson learners will discover that blocks can be joined together in ScratchJr. They will use a **Start** block to run their programs. They will also learn additional skills such as adding backgrounds and deleting sprites. Learners will follow given algorithms to create simple programs.	To show that a series of commands can be joined together • I can use more than one block by joining them together • I can use a **Start** block in a program • I can run my program
3 Make a change	During this lesson learners will discover that some blocks in ScratchJr have numbers underneath them. They will learn how to change these values and identify the effect on a block of changing a value.	To identify the effect of changing a value • I can find blocks that have numbers • I can change the value • I can say what happens when I change a value
4 Adding sprites	During this lesson learners will be taught how to add and delete sprites in ScratchJr. They will discover that each sprite has its own programming area, and learn how to add programming blocks to give instructions to each of the sprites.	To explain that each sprite has its own instructions • I can show that a project can include more than one sprite • I can delete a sprite • I can add blocks to each of my sprites
5 Project design	During this lesson learners will choose appropriate backgrounds and sprites for a 'Space race' project. They will decide how each sprite will move, and create an algorithm based on the blocks available in ScratchJr that reflects this.	To design the parts of a project • I can choose appropriate artwork for my project • I can decide how each sprite will move • I can create an algorithm for each sprite
6 Following my design	During this lesson learners will use their project designs from the previous lesson to create their projects on-screen in ScratchJr. They will use their project design, including algorithms created in the previous lesson, to make programs for each of their rocket sprites. They will test whether their algorithms are effective when their programs are run.	To use my algorithm to create a program • I can use sprites that match my design • I can add programming blocks based on my algorithm • I can test the programs I have created

Curriculum offer – Year 2
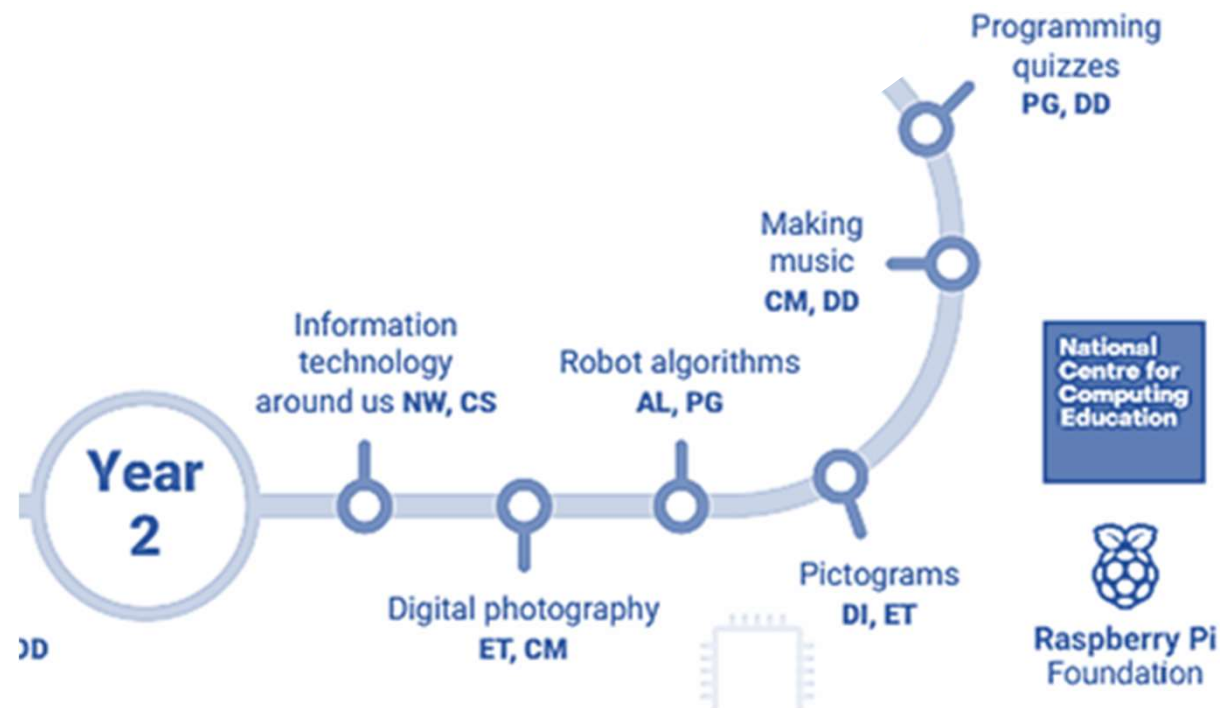
Curriculum offer

Year 2 – Information technology around us

Learners will develop their understanding of what information technology (IT) is and will begin to identify examples. They will discuss where they have seen IT in school and beyond, in settings such as shops, hospitals, and libraries. Learners will then investigate how IT improves our world, and they will learn about the importance of using IT responsibly.

Progression

This unit progresses learners' understanding of technology and how they interact with it. They will develop this understanding to become familiar with the term information technology and will be able to identify common features of IT. This unit also builds on the learners' understanding of using technology safely and responsibly. Please see the learning graph for this unit for more information about progression.

Lesson	Brief overview	Learning objectives
1 What is IT?	Learners will develop their understanding of what information technology (IT) is. They will identify devices that are computers and consider how IT can help them both at school and beyond	To recognise the uses and features of information technology • I can identify examples of computers • I can describe some uses of computers • I can identify that a computer is a part of IT
2 IT in school	Learners will consider common uses of information technology in a context that they are familiar with. They will identify examples of IT and be able to explain the purpose of different examples of IT in the school setting.	To identify the uses of information technology in the school • I can identify examples of IT • I can sort school IT by what it's used for • I can identify that some IT can be used in more than one way
3 IT in the world	Learners will begin to explore IT in environments beyond school, including home and familiar places such as shops. They will talk about the uses of IT in these environments and be able to explain that IT is used in many workplaces	To identify information technology beyond school • I can find examples of information technology • I can sort IT by where it is found • I can talk about uses of information technology
4 The benefits of IT	Learners will explore the benefits of using IT in the wider world. They will focus on the use of IT in a shop and how devices can work together. Learners will sort activities based on whether they use IT or not and will be able to say why we use IT.	To explain how information technology helps us • I can recognise common types of technology • I can demonstrate how IT devices work together • I can say why we use IT
5 Using IT safely	Learners will consider how they use different forms of information technology safely, in a range of different environments. They will list different uses of IT and talk about the different rules that might be associated with using them. Learners will then say how rules can help keep them safe when using IT.	To explain how to use information technology safely • I can list different uses of information technology • I can talk about different rules for using IT • I can say how rules can help keep me safe
6 Using IT in different ways	Learners will think about the choices that are made when using information technology, and the responsibility associated with those choices. They will use IT in different types of activities and explain that sometimes they will need to use IT in different ways	To recognise that choices are made when using information technology • I can identify the choices that I make when using IT • I can use IT for different types of activities • I can explain the need to use IT in different ways

Curriculum offer

Year 2 – Digital photography

Learners will learn to recognise that different devices can be used to capture photographs and will gain experience capturing, editing, and improving photos. Finally, they will use this knowledge to recognise that images they see may not be real.

It is recommended that you use digital cameras to take photographs in these lessons, so that learners can experience a range of devices. However, tablets or other devices with cameras will also work. This unit uses screenshots from the website https://pixlr.com/x/, but you could also use the Pixlr app if you're using tablets.

Progression

This unit begins the learners' understanding of how photos are captured and can be manipulated for different purposes. Following this unit, learners will develop their photo editing skills in Year 4. Please see the learning graph for this unit for more information about progression.

Lesson	Brief overview	Learning objectives
1 Taking photographs	This lesson introduces the concept that many devices can be used to take photographs. In the lesson, learners begin to capture their own photographs.	To use a digital device to take a photograph • I can recognise what devices can be used to take photographs • I can talk about how to take a photograph • I can explain what I did to capture a digital photo
2 Landscape or portrait?	A photograph can be taken in either portrait or landscape format. In this lesson, learners explore taking photographs in both portrait and landscape formats and explore the reasons why a photographer may favour one over the other.	To make choices when taking a photograph • I can explain the process of taking a good photograph • I can take photos in both landscape and portrait format • I can explain why a photo looks better in portrait or landscape format
3 What makes a good photograph?	A photograph is composed by a photographer. In this lesson, learners discover what constitutes good photography composition and put this into practice by composing and capturing photos of their own.	To describe what makes a good photograph • I can identify what is wrong with a photograph • I can discuss how to take a good photograph • I can improve a photograph by retaking it
4 Lighting	This lesson introduces the concepts of light and focus as further important aspects of good photography composition. In this lesson, learners investigate the effect that good lighting has on the quality of the photos they take, and explore what effect using the camera flash and adding an artificial light source have on their photos. They also learn how the camera autofocus tool can be used to make an object in an image stand out.	To decide how photographs can be improved • I can explore the effect that light has on a photo • I can experiment with different light sources • I can explain why a picture may be unclear
5 Effects	This lesson introduces the concept of simple image editing. Learners are introduced to the Pixlr image editing software and use the 'Adjust' tool to change the colour effect of an image.	To use tools to change an image • I can recognise that images can be changed • I can use a tool to achieve a desired effect • I can explain my choices
6 Is it real?	This lesson introduces the concept that images can be changed for a purpose. Learners are introduced to a range of images that have been changed in different ways and through this, develop an awareness that not all images they see are real. To start the lesson, learners are first challenged to take their best photograph by applying the photography composition skills that they have developed during the unit.	To recognise that photos can be changed • I can apply a range of photography skills to capture a photo • I can recognise which photos have been changed • I can identify which photos are real and which have been changed

Curriculum offer

Year 2 – Programming A – Robot algorithms

Unit introduction

This unit develops learners' understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Learners will use given commands in different orders to investigate how the order affects the outcome. They will also learn about design in programming. They will develop artwork and test it for use in a program. They will design algorithms and then test those algorithms as programs and debug them.

There are two Year 2 programming units:

Programming A – Robot algorithms

Programming B – Programming quizzes

This is unit A, which should be delivered before unit B.

This unit includes references relating to Bee-Bot and Blue-Bot floor robots, however, other educational floor robots are available. Learners should be given access to a device with a limited range of functions that is designed for young learners. Before delivering this unit, ensure that you are familiar with your school's floor robots, including charging or battery requirements. You should also know how to switch the devices on and off, as well as key functions such as clearing the memory. It is advisable to use the robots on the floor if possible, as this can reduce damage caused by dropping.

Progression

In advance of the lessons in this Year 2 unit, learners should have had some experience of creating short programs using floor robots and predicting the outcome of a simple program. This unit progresses learners' knowledge and understanding of algorithms and how they are implemented as programs on digital devices. Learners will spend time looking at how the order of commands affects outcomes. Learners will use this knowledge and logical reasoning to trace programs and predict outcomes.

Please see the learning graph for this unit for more information about progression.

Curriculum offer

Year 2 – Programming A – Robot algorithms

Overview of lessons

Lesson	Brief overview	Learning objectives
1 Giving instructions	Learners will follow instructions given to them and give instructions to others. They will consider the language used to give instructions, and how that language needs to be clear and precise. Learners will combine several instructions into a sequence that can then be issued to another learner to complete. They will then consider a clear and precise set of instructions in relation to an algorithm, and will think about how computers can only follow clear and unambiguous instructions.	To describe a series of instructions as a sequence • I can follow instructions given by someone else • I can choose a series of words that can be acted out as a sequence • I can give clear instructions
2 Same but different	Learners will focus on sequences, and consider the importance of the order of instructions within a sequence. They will create sequences using the same instructions in different orders. They will then test these sequences to see how the different orders affect the outcome.	To explain what happens when we change the order of instructions • I can use the same instructions to create different algorithms • I can use an algorithm to program a sequence on a floor robot • I can show the difference in outcomes between two sequences that consist of the same instructions
3 Making predictions	Learners will use logical reasoning to make predictions. They will follow a program step by step and identify what the outcome will be. Note: Learners may need to be encouraged to think through their predictions and understand that they are reasoned decisions rather than guesses.	To use logical reasoning to predict the outcome of a program • I can follow a sequence • I can predict the outcome of a sequence • I can compare my prediction to the program outcome
4 Mats and routes	Learners will design, create, and test a mat for a floor robot. This will introduce the idea that design in programming not only includes code and algorithms, but also artefacts related to the project, such as artwork. Note: The designs in this lesson can be changed to suit a topic or theme that the class is learning about. The ideas included in the slides are examples.	To explain that programming projects can have code and artwork • I can explain the choices that I made for my mat design • I can identify different routes around my mat • I can test my mat to make sure that it is usable
5 Algorithm design	Learners will design an algorithm to move their robot around the mat that they designed in Lesson 4. As part of the design process, learners will outline what their task is by identifying the starting and finishing points of a route. This outlining will ensure that learners clearly understand what they want their program to achieve.	To design an algorithm • I can explain what my algorithm should achieve • I can create an algorithm to meet my goal • I can use my algorithm to create a program
6 Break it down	Learners will take on a larger programming task. They will break the task into chunks and create algorithms for each chunk. This process is known as 'decomposition' and is covered further in key stage 2. Learners will also find and fix errors in their algorithms and programs. They will understand this process to be 'debugging'.	To create and debug a program that I have written • I can test and debug each part of the program • I can plan algorithms for different parts of a task • I can put together the different parts of my program

Curriculum offer

Year 2 – Pictograms

Unit introduction

Learners will begin to understand what the term data means and how data can be collected in the form of a tally chart. They will learn the term 'attribute' and use this to help them organise data. They will then progress onto presenting data in the form of pictograms and finally block diagrams. Learners will use the data presented to answer questions.

During this unit of work learners will use j2e pictogram tool which can be accessed online using a desktop, laptop or tablet computer. Your school may have access to an equivalent alternative which could be used instead.

Overview of lessons

Progression

This unit progresses students' knowledge and understanding of grouping data. It builds on the Year 1 Data and Information unit where learners labelled objects and grouped them based on different properties. In Year 3 learners develop their understanding of attributes (properties) using branching databases to structure data according to different object attributes.

Please see the learning graph for this unit for more information about progression.

Curriculum offer

Year 2 – Pictograms

Lesson	Brief overview	Learning objectives
1 Counting and comparing	During this lesson learners will begin to understand the importance of organising data effectively for counting and comparing. They will create their own tally charts to organise data, and represent the tally count as a total. Finally, they will answer questions comparing totals in tally charts using vocabulary such as 'more than' and 'less than'.	To recognise that we can count and compare objects using tally charts • I can record data in a tally chart • I can represent a tally count as a total • I can compare totals in a tally chart
2 Enter the data	During this lesson learners will become familiar with the term 'pictogram'. They will create pictograms manually and then progress to creating them using a computer. Learners will begin to understand the advantages of using computers rather than manual methods to create pictograms, and use this to answer simple questions.	To recognise that objects can be represented as pictures • I can enter data onto a computer • I can use a computer to view data in a different format • I can use pictograms to answer simple questions about objects
3 Creating pictograms	During this lesson learners will think about the importance of effective data collection and will consider the benefits of different data collection methods: why, for example, we would use a pictogram to display the data collected. They will collect data to create a tally chart and use this to make a pictogram on a computer. Learners will explain what their finished pictogram shows by writing a range of statements to describe this.	To create a pictogram • I can organise data in a tally chart • I can use a tally chart to create a pictogram • I can explain what the pictogram shows
4 What is an attribute?	During this lesson learners will think about ways in which objects can be grouped by attribute. They will then tally objects using a common attribute and present the data in the form of a pictogram. Learners will answer questions based on their pictograms using mathematical vocabulary such as 'more than'/'less than' and 'most'/'least'.	To select objects by attribute and make comparisons • I can tally objects using a common attribute • I can create a pictogram to arrange objects by an attribute • I can answer 'more than'/'less than' and 'most/least' questions about an attribute
5 Comparing people	During this lesson learners will understand that people can be described by attributes. They will practise using attributes to describe images of people and the other learners in the class. The learners will collect data needed to organise people using attributes and create a pictogram to show this pictorially. Finally, learners will draw conclusions from their pictograms and share their findings.	To recognise that people can be described by attributes • I can choose a suitable attribute to compare people • I can collect the data I need • I can create a pictogram and draw conclusions from it
6 Presenting information	During this lesson learners will understand that there are other ways to present data than using tally charts and pictograms. They will use a pre-made tally chart to create a block diagram on their device. Learners will then share their data with a partner and discuss their findings. They will consider whether it is always OK to share data and when it is not OK. They will know that it is alright to say no if someone asks for their data, and how to report their concerns.	To explain that we can present information using a computer • I can use a computer program to present information in different ways • I can share what I have found out using a computer • I can give simple examples of why information should not be shared

Curriculum offer

Year 2 – Making music

Unit introduction

In this unit, learners will be using a computer to create music. They will listen to a variety of pieces of music and consider how music can make them think and feel. Learners will compare creating music digitally and non-digitally. Learners will look at patterns and purposefully create music.

Progression

Learners should have experience of making choices on a tablet/computer, and they should be able to navigate within an application. Learners should also have some experience of patterns.

This unit progresses students' knowledge through listening to music and considering how music can affect how we think and feel. Learners will then purposefully create rhythm patterns and music.

Please see the learning graph for this unit for more information about progression.

Curriculum offer

Year 2 – Making music

Lesson	Brief overview	Learning objectives
1 How music makes us feel	In this lesson learners will listen to and compare two pieces of music from The Planets by Gustav Holst. They will then use a musical description word bank to describe how this music generates emotions, i.e. how it makes them feel.	To say how music can make us feel • I can identify simple differences in pieces of music • I can describe music using adjectives • I can say what I do and don't like about a piece of music
2 Rhythms and patterns	In this lesson, learners will explore rhythm. They will create patterns and use those patterns as rhythms. They will use untuned percussion instruments and computers to hear the different rhythm patterns that they create.	To identify that there are patterns in music • I can create a rhythm pattern • I can play an instrument following a rhythm pattern • I can explain that music is created and played by humans
3 How music can be used	During this lesson, learners will explore how music can be used in different ways to express emotions and to trigger their imaginations. They will experiment with the pitch of notes to create their own piece of music, which they will then associate with a physical object — in this case, an animal.	To experiment with sound using a computer • I can connect images with sounds • I can use a computer to experiment with pitch • I can relate an idea to a piece of music
4 Notes and tempo	In this lesson, learners will develop their understanding of music. They will use a computer to create and refine musical patterns.	To use a computer to create a musical pattern • I can identify that music is a sequence of notes • I can explain how my music can be played in different ways • I can refine my musical pattern on a computer
5 Creating digital music	In this lesson, learners will choose an animal and create a piece of music using the animal as inspiration. They will think about their animal moving and create a rhythm pattern from that. Once they have defined a rhythm, they will create a musical pattern (melody) to go with it.	To create music for a purpose • I can create a rhythm which represents an animal I've chosen • I can create my animal's rhythm on a computer • I can add a sequence of notes to my rhythm
6 Reviewing and editing music	In this lesson, learners will retrieve and review their work. They will spend time making improvements and then share their work with the class.	To review and refine our computer work • I can review my work • I can explain how I changed my work • I can listen to music and describe how it makes me feel

Curriculum offer

Year 2 – Programming quizzes

Unit introduction

This unit initially recaps on learning from the Year 1 ScratchJr unit 'Programming B – Programming animations'. Learners begin to understand that sequences of commands have an outcome, and make predictions based on their learning. They use and modify designs to create their own quiz questions in ScratchJr, and realise these designs in ScratchJr using blocks of code. Finally, learners evaluate their work and make improvements to their programming projects.

There are two Year 2 programming units:

Programming A – Robot algorithms

Programming B – Programming quizzes

This is unit B, which should be delivered after unit A.

Progression

This unit progresses learners' knowledge and understanding of instructions in sequences and the use of logical reasoning to predict outcomes.

See the learning graph for this unit for more information about progression.
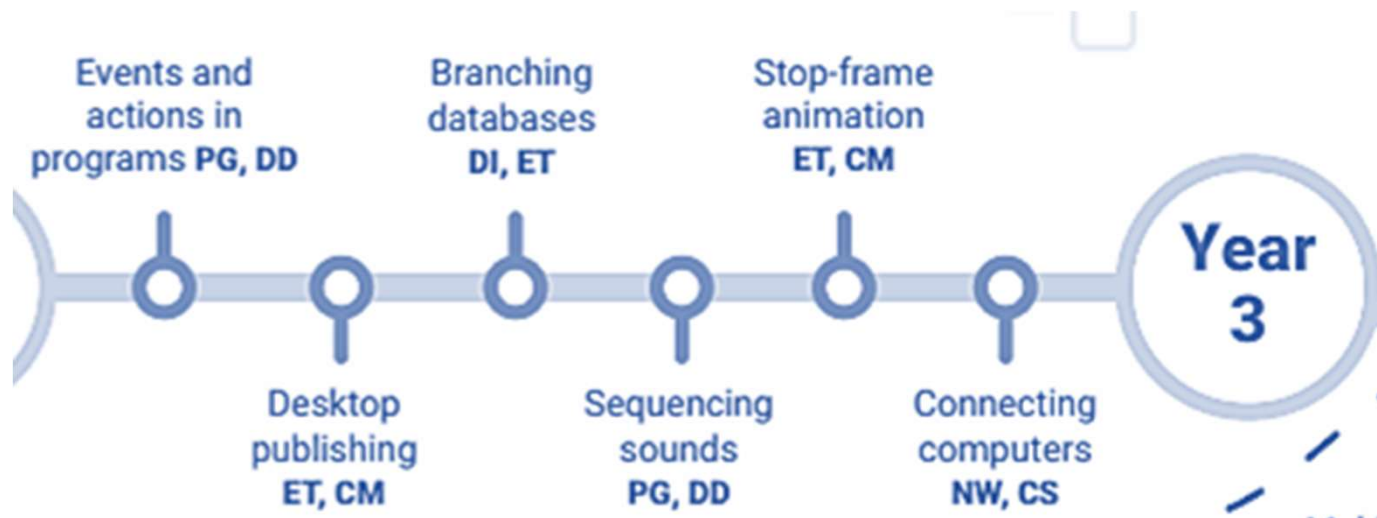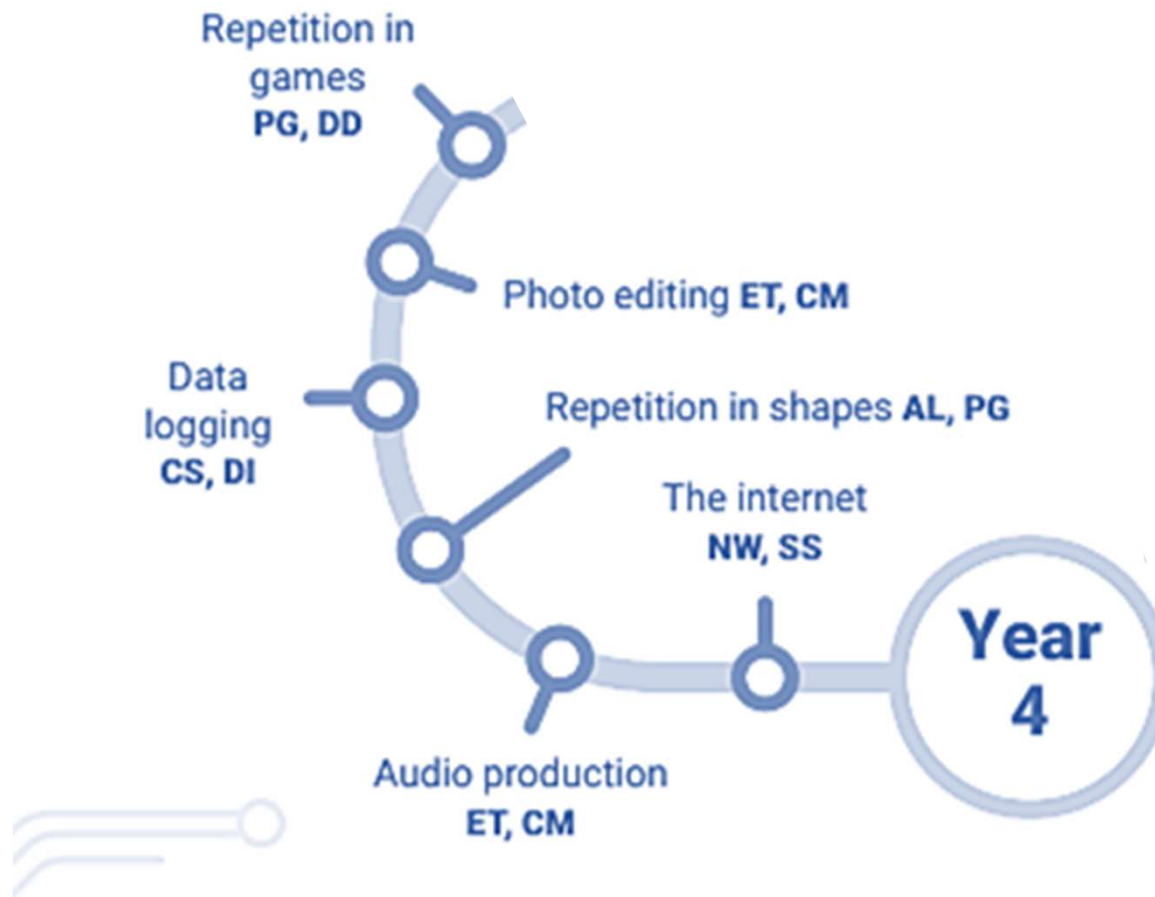
Curriculum offer
Year 2 – Programming quizzes

Lesson	Brief overview	Learning objectives
ScratchJr recap	During this lesson, learners will recap what they know already about the ScratchJr app. They will begin to identify the start of sequences in real-world scenarios, and learn that sequences need to be started in ScratchJr. Learners will create programs and run them in full-screen mode using the Green flag.	To explain that a sequence of commands has a start • I can identify the start of a sequence • I can identify that a program needs to be started • I can show how to run my program
Outcomes	During this lesson, learners will discover that a sequence of commands has an 'outcome'. They will predict the outcomes of real-life scenarios and a range of small programs in ScratchJr. Learners will then match programs that produce the same outcome when run, and use a set of blocks to create programs that produce different outcomes when run.	To explain that a sequence of commands has an outcome • I can predict the outcome of a sequence of commands • I can match two sequences with the same outcome • I can change the outcome of a sequence of commands
Using a design	During this lesson, learners will be taught how to use the Start on tap and Go to page (Change background) blocks. They will use a predefined design to create an animation based on the seasons. Learners will then be introduced to the task for the next lesson. They will predict what a given algorithm might mean.	To create a program using a given design • I can work out the actions of a sprite in an algorithm • I can decide which blocks to use to meet the design • I can build the sequences of blocks I need
Changing a design	During this lesson, learners will look at an existing quiz design and think about how this can be realised within the ScratchJr app. They will choose backgrounds and characters for their own quiz projects. Learners will modify a given design sheet and create their own quiz questions in ScratchJr.	To change a given design • I can choose backgrounds for the design • I can choose characters for the design • I can create a program based on the new design
Designing and creating a program	During this lesson, learners will create their own quiz question designs including their own choices of question, artwork, and algorithms. They will increase the number of blocks used within their sequences to create more complex programs.	To create a program using my own design • I can choose the images for my own design • I can create an algorithm • I can build sequences of blocks to match my design
Evaluating	During this lesson, learners will compare their projects to their designs. They will think about how they could improve their designs by adding additional features. They will modify their designs and implement the changes on their devices. Learners will find and correct errors in programs (debug) and discuss whether they debugged errors in their own projects.	To decide how my project can be improved • I can compare my project to my design • I can improve my project by adding features • I can debug my program

Curriculum offer – Year 3

Curriculum offer – Year 4

Repetition in games **PG, DD**

Photo editing **ET, CM**

Data logging **CS, DI**

Repetition in shapes **AL, PG**

The internet **NW, SS**

Audio production **ET, CM**

Year 4

Curriculum offer – Year 5

Year 5

Sharing information
NW, ET

Video production
CM, DD

Selection in physical computing
PG, CS

Flat-file databases
DI, ET

Vector drawing
ET, CM

Selection in quizzes AL, PG
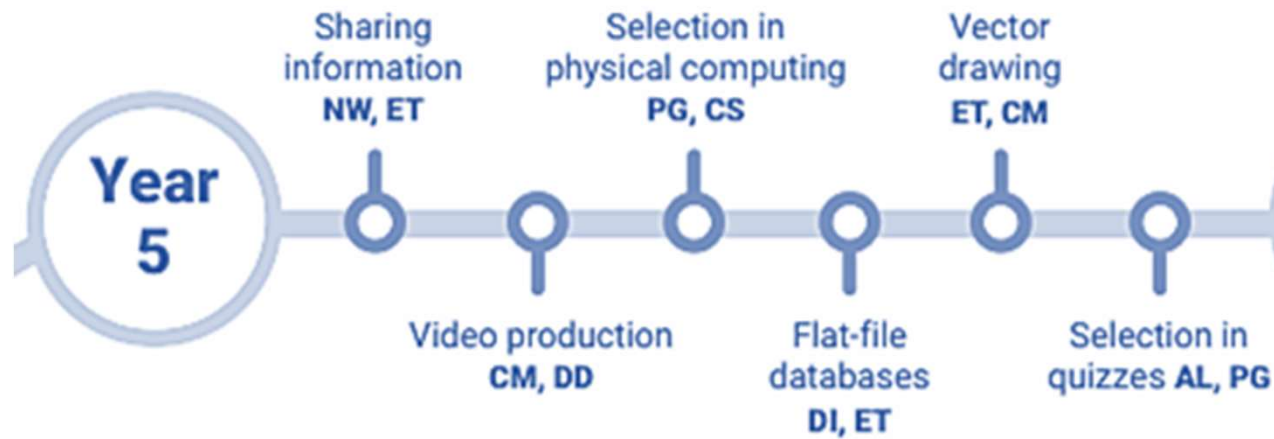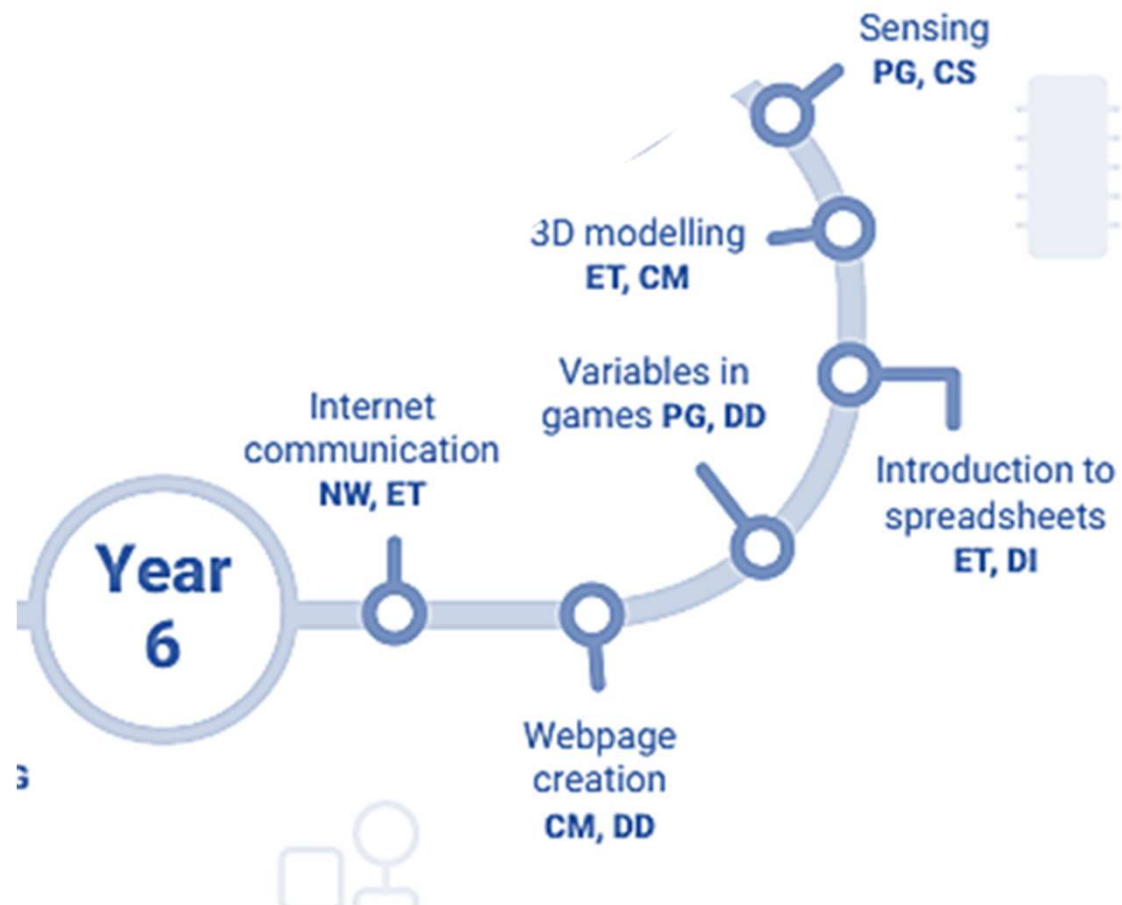
Curriculum offer – Year 6

Software and hardware overview

Requirements for pupils — below

✓ Used for the unit — reflected in screenshots   ● Could be used as an alternative

	Desktop or laptop	Chromebook	Tablet	Software or hardware
1.1 Technology around us	✓	✓	●	paintz.app
1.2 Digital painting	✓	✓	●	Microsoft Paint or similar
1.3 Moving a robot				Bee-Bot, Blue-Bot, or other fixed-movement floor robot
1.4 Grouping data	✓	✓		Google Slides or Microsoft PowerPoint
1.5 Digital writing	✓	✓	●	Google Docs or Microsoft Word
1.6 Programming animations	●	●	✓	ScratchJr
2.1 Information technology around us	✓	✓		Google Slides or Microsoft PowerPoint
2.2 Digital photography	✓		●	Digital camera
2.3 Robot algorithms				Bee-Bot, Blue-Bot, or other fixed-movement floor robot
2.4 Pictograms	✓	✓	●	j2data Pictogram
2.5 Digital music	✓	✓	●	Chrome Music Lab
2.6 Programming quizzes	●	●	✓	ScratchJr

	Desktop or laptop	Chromebook	Tablet	Software or hardware
3.1 Connecting computers	✓	●	●	Painting program (any)
3.2 Stop-frame animation	●	●	✓	iMotion (app for iOS)
3.3 Sequencing sounds	✓	✓	●	Scratch
3.4 Branching databases	✓	✓	●	j2data Branch and Pictogram
3.5 Desktop publishing	✓	●	●	Canva.com
3.6 Events and actions in programs	✓	✓	●	Scratch
4.1 The internet	✓	✓	✓	Various websites
4.2 Audio production	✓			Audacity
4.3 Repetition in shapes	✓	●	●	FMSLogo
4.4 Data logging	✓	+	+	Data logger and associated software
4.5 Photo editing	✓	●		Paint.NET (for Microsoft Windows)
4.6 Repetition in games	✓	✓	●	Scratch

	Desktop or laptop	Chromebook	Tablet	Software or hardware
5.1 Systems and Searching	✓	✓		Google Slides
5.2 Video production	✓	●	●	Microsoft Photos (for Microsoft Windows 10)
5.3 Selection in physical computing	✓	✓		Crumble controller + starter kit + motor
5.4 Flat-file databases	✓	✓	●	j2data Database
5.5 Introduction to vector graphics	✓	●		Google Drawings
5.6 Selection in quizzes	✓	✓		Scratch
6.1 Communication and collaboration	✓	✓		Google Slides
6.2 Webpage creation	✓	✓		Google Sites