



# **SHERINGDALE**

**Computing  
Medium Term Planning**



**'A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world.' *National curriculum***

For each unit:

- ➔ First lesson to include 'Why we are learning about this topic' at the start of the lesson + introduce the enquiry question.
  - Computing is learning about how computers and systems work, how they are programmed, and how to use these programs to create different forms of media. Most importantly, how we do this while keeping safe online.
- ➔ Rest of the lessons to include sticky knowledge at the start of each lesson + enquiry question.
- ➔ Look at the Prior knowledge at the start of each unit to know what knowledge to recap.
- ➔ Each lesson includes a challenge to extend children on further.
- ➔ Large focus on automaticity – How are children doing tasks such as saving a file by themselves?
- ➔ How do children apply computational thinking to their tasks?



# EYFS

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|--------------------------|--|--|
| Three and four year olds | Communication and Language                 | <ul style="list-style-type: none"> <li>• Use a wider range of vocabulary.</li> <li>• Understand a question or instruction that has two parts, such as: “Get your coat and wait at the door”</li> <li>• Understand ‘why’ questions, like: “Why do you think the caterpillar got so fat?”</li> <li>• Be able to express a point of view and to debate when they disagree with an adult or a friend, using words as well as actions.</li> </ul> |
|                          | Personal, Social and Emotional Development | <ul style="list-style-type: none"> <li>• Increasingly follow rules, understanding why they are important. Remember rules without needing an adult to remind them.</li> </ul>   |
|                          | Physical Development                       | <ul style="list-style-type: none"> <li>• Match their developing physical skills to tasks and activities in the setting.</li> </ul>   |
|                          | Mathematics                                | <ul style="list-style-type: none"> <li>• Begin to describe a sequence of events, real or fictional, using words such as ‘first’, ‘then...’</li> </ul>  |
|                          | Understanding the World                    | <ul style="list-style-type: none"> <li>• Explore how things work.</li> </ul>   |
| Reception                | Communication and Language                 | <ul style="list-style-type: none"> <li>• Learn new vocabulary.</li> <li>• Connect one idea or action to another using a range of connectives.</li> <li>• Use talk to help work out problems and organise thinking and activities, and to explain how things work and why they might happen.</li> </ul>   |
|                          | Personal, Social, Emotional Development    | <ul style="list-style-type: none"> <li>• Show resilience and perseverance in the face of challenge.</li> <li>• Know and talk about the different factors that support their overall health and wellbeing:               <ul style="list-style-type: none"> <li>• sensible amounts of ‘screen time’</li> </ul> </li> </ul>  |
|                          | Physical Development                       | <ul style="list-style-type: none"> <li>• Develop their small motor skills so that they can use a range of tools competently, safely and confidently.</li> </ul>  |
|                          | Expressive Arts and Design                 | <ul style="list-style-type: none"> <li>• Explore, use and refine a variety of artistic effects to express their ideas and feelings.</li> </ul>   |
| Early Learning Goals     | Personal, Social and Emotional Development | <b>Managing Self</b> <ul style="list-style-type: none"> <li>• Be confident to try new activities and show independence, resilience and perseverance in the face of challenge.</li> <li>• Explain the reasons for rules, know right from wrong and try to behave accordingly.</li> </ul>  |
|                          | Expressive Arts and Design                 | <ul style="list-style-type: none"> <li>• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.</li> </ul>  |



# Year 1

## Autumn 1 –

### Creating Media – Digital Painting

WALT: describe what different freehand tools do

- This lesson introduces learners to the freehand tools available for digital painting.

WALT: describe what different freehand tools do

- 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.

WALT: make careful choices when painting a digital picture

- This lesson introduces learners to a range of shape tools, allowing them to create a painting in the style of an artist.

WALT: explain why I chose the tools I used

- 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.

WALT: use a computer on my own to paint a picture

- Learners select appropriate colours, brush sizes, and brush tools to independently create their own image in the style of an artist.

WALT: compare painting a picture on a computer and on paper

- Learners compare their preferences when creating paintings on computers and on paper.

## Autumn 2 –

### Programming A – Moving a Robot

WALT: explain what a given command will do

- 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.

WALT: act out a given word

- 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.

WALT: combine 'forwards' and 'backwards' commands to make a sequence

- 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.

WALT: combine four direction commands to make sequences



- 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.
- Learners will make their predictions by looking at the commands and matching the program steps to movements.

WALT: plan a simple program

- 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.

WALT: find more than one solution to a problem

- 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.
- 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.

## Spring 1 – Data and Information – Grouping Data

WALT: label objects

- 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.

WALT: identify that objects can be counted

- 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.

WALT: describe objects in different ways

- 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.

WALT: count objects with the same properties

- 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.

WALT: compare groups of objects

- 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.



WALT: answer questions about groups of objects

- 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.

## Spring 2 – **Computing Systems and Networks – Technology** Around Us

WALT: identify technology

- Learners will become familiar with the term 'technology'.
- Learners will demonstrate their understanding of how technology helps us in different ways.
- They will be able to explain how to keep themselves safe online and where to go for support when they see content that makes them feel uncomfortable.

WALT: identify a computer and its main parts

- 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.

WALT: use a mouse in different ways

- 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.

WALT: use a keyboard to type on a computer

- 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.

WALT: use the keyboard to edit text

- 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.

WALT: create rules for using technology 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.

## Summer 1 – **Creative Media – Digital Writing**

WALT: use a computer to write

- Learners will familiarise themselves with a word processor and think about how they might use this application in the future.
- The learners will also identify and find keys, before adding text to their page by pressing keys on a keyboard.



WALT: add and remove text on a computer

- Learners will continue to familiarise themselves with word processors and how they can interact with the computer using a keyboard.
- The learners will focus on adding text and will explore more of the keys found on a keyboard.
- Finally, they will begin to use the Backspace key to remove text from the computer.

WALT: identify that the look of text can be changed on a computer

- Learners will begin to explore the different tools that can be used in word processors to change the look of the text. Learners will use the Caps Lock key to add capital letters to their writing and will begin thinking about how to use this successfully. Learners will match simple descriptions to the related keys. Finally, learners will begin exploring the different buttons available on the toolbar in more detail, and use these to change their own text.

WALT: make careful choices when changing text

- Learners will begin to understand when it is best to change the look of their text and which tool will achieve the most appropriate outcome.
- The learners will begin to use their mouse cursor to select text to enable them to make more efficient changes.
- They will explore the different fonts available to them and change the font for their lost toy poster.

WALT: explain why I used the tools that I chose

- Learners will begin to justify their use of certain tools when changing text.
- The learners will decide whether the changes that they have made have improved their writing and will begin to use 'Undo' to remove changes.
- They will begin to consolidate their ability to select text using the cursor, through double-clicking and clicking and dragging.
- The learners will be able to explain what tool from the toolbar they have used to change their writing.

WALT: compare typing on a computer to writing on paper

- Learners will make comparisons between using a computer for writing and writing on paper.
- The learners will discuss how the two methods are the same and different and think of examples to explain this.
- They will demonstrate making changes to writing using a computer to compare the two methods.
- Finally, the learners will begin to explain which they like best and think about which method would be the best method to use in different situations.

## Summer 2 – Programming B – Introduction to Animation

WALT: To choose a command for a given purpose

- 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.

WALT: To choose a command for a given purpose

- 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.

WALT: To identify the effect of changing a value

- 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.



WALT: To explain that each sprite has its own instructions

- 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.

WALT: To design the parts of a project

- 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.

WALT: To use my algorithm to create a program

- 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

# Year 2

## Autumn 1 –

### Programming A – Robot Algorithms

WALT: To describe a series of instructions as a sequence

- 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.

WALT: explain what happens when we change the order of instructions

- 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.

WALT: use logical reasoning to predict the outcome of a program

- Learners will use logical reasoning to make predictions. They will follow a program step by step and identify what the outcome will be.

WALT: explain that programming projects can have code and artwork

- 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.

WALT: design an algorithm

- 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.



WALT: create and debug a program that I have written

- 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'.

## **Autumn 2 –** **Creating Media – Digital Photography**

WALT: To use a digital device to take a photograph

- This lesson introduces the concept that many devices can be used to take photographs.
- In the lesson, learners begin to capture their own photographs.

WALT: make choices when taking a photograph

- 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.

WALT: describe 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.

WALT: decide how photographs can be improved

- 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.

WALT: use tools to change an image

- 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.

WALT: recognise that photos can be changed

- 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.

## **Spring 1 –** **Computing Systems and Networks – IT Around** **Us**

WALT: recognise the uses and features of information technology

- 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.

WALT: identify the uses of information technology in the 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.

WALT: identify information technology beyond school

- 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.

WALT: explain how information technology helps us

- 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.

WALT: explain how to use information technology 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.

WALT: recognise that choices are made when using information technology

- 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.

## Spring 2 – Data and Information - Pictograms

WALT: recognise that we can count and compare objects using tally charts

- 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'.

WALT: recognise that objects can be represented as pictures

- 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.

WALT: create a pictogram

- 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.

WALT: select objects by attribute and make comparisons

- 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'.

WALT: recognise that people can be described by attributes

- 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.

WALT: explain that we can present information using a computer

- 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.

## Summer 1 – Creating Media – Making Music

WALT: say how music can make 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.

WALT: identify that there are patterns in music

- 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.

WALT: experiment with sound using a computer

- 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.

WALT: use a computer to create a musical pattern

- In this lesson, learners will develop their understanding of music. They will use a computer to create and refine musical patterns.

WALT: create music for a purpose

- 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.

WALT: review and refine our computer work

- In this lesson, learners will retrieve and review their work. They will spend time making improvements and then share their work with the class.

## Summer 2 – Programming B – An Introduction to Quizzes

WALT: explain that a sequence of commands has a start

- During this lesson, learners will recap what they know already about the ScratchJr app.



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| <ul style="list-style-type: none"><li>• They will begin to identify the start of sequences in real-world scenarios, and learn that sequences need to be started in ScratchJr.</li><li>• Learners will create programs and run them in full-screen mode using the <b>Green flag</b>.</li></ul>   |
| <p><u>WALT: explain that a sequence of commands has an outcome</u></p> <ul style="list-style-type: none"><li>• During this lesson, learners will discover that a sequence of commands has an 'outcome'.</li><li>• They will predict the outcomes of real-life scenarios and a range of small programs in ScratchJr.</li><li>• 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.</li></ul>    |
| <p><u>WALT: create a program using a given design</u></p> <ul style="list-style-type: none"><li>• During this lesson, learners will be taught how to use the <b>Start on tap</b> and <b>Go to page (Change background)</b> blocks.</li><li>• 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.</li><li>• They will predict what a given algorithm might mean.</li></ul>                                    |
| <p><u>WALT: change a given design</u></p> <ul style="list-style-type: none"><li>• During this lesson, learners will look at an existing quiz design and think about how this can be realised within the ScratchJr app.</li><li>• 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.</li></ul>   |
| <p><u>WALT: create a program using my own design</u></p> <ul style="list-style-type: none"><li>• During this lesson, learners will create their own quiz question designs including their own choices of question, artwork, and algorithms.</li><li>• They will increase the number of blocks used within their sequences to create more complex programs.</li></ul>  |
| <p><u>WALT: decide how my project can be improved</u></p> <ul style="list-style-type: none"><li>• 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.</li><li>• They will modify their designs and implement the changes on their devices.</li><li>• Learners will find and correct errors in programs (debug) and discuss whether they debugged errors in their own projects.</li></ul> |

# Year 3

## Autumn 1 –

### Creating Media - Animation

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| <p><u>WALT: To explain that animation is a sequence of drawings or photographs</u></p> <ul style="list-style-type: none"><li>• Learners will discuss whether they think a picture can move.</li><li>• They will learn about simple animation techniques and create their own animations in the style of flip books (flick books) using sticky notes.</li></ul> |
| <p><u>WALT: relate animated movement with a sequence of images</u></p> <ul style="list-style-type: none"><li>• In the previous lesson, learners created their own flip book–style animations. In this lesson, they will develop this knowledge and apply it to make a stop-frame animation using a tablet.</li></ul>   |
| <p><u>WALT: plan an animation</u></p> <ul style="list-style-type: none"><li>• Remind the learners of the animations that we created last week and tell them that next week we will use tablets to animate some of our own stories.</li></ul>   |



- Tell the learners that during this lesson they will create a storyboard showing the characters, settings and events that they would like to include in their own stop-frame animation next week.

**WALT: identify the need to work consistently and carefully**

- In the previous lesson, learners planned out their own stop-frame animations in a storyboard. This lesson, they will use tablets to carefully create stop-frame animations, paying attention to consistency.

**WALT: review and improve an animation**

- Last lesson, learners created their own stop-frame animations. This lesson, they will evaluate their animations and try to improve them by creating a brand-new animation based on their feedback.

**WALT: evaluate the impact of adding other media to an animation**

- Last lesson, learners perfected their stop-frame animations. This lesson, they will add other media and effects into their animations, such as music and text.

## **Autumn 2 – Programming A – Sequence in Music**

**WALT: To explore a new programming environment**

- This lesson introduces learners to a new programming environment: Scratch.
- Learners will begin by comparing Scratch to other programming environments they may have experienced, before familiarising themselves with the basic layout of the screen.

**WALT: identify that commands have an outcome**

- In this lesson, learners will create movement for more than one sprite. In doing this, they will design and implement their code, and then will create code to replicate a given outcome.
- Finally, they will experiment with new motion blocks.

**WALT: explain that a program has a start**

- In this lesson, learners will be introduced to the concept of sequences by joining blocks of code together.
- They will also learn how event blocks can be used to start a project in a variety of different ways. In doing this, they will apply principles of design to plan and create a project.

**WALT: recognise that a sequence of commands can have an order**

- This lesson explores sequences, and how they are implemented in a simple program.
- Learners have the opportunity to experiment with sequences where order is and is not important.
- They will create their own sequences from given designs.

**WALT: change the appearance of my project**

- This lesson develops learners' understanding of sequences by giving them the opportunity to combine motion and sounds in one sequence.
- They will also learn how to use costumes to change the appearance of a sprite, and backdrops to change the appearance of the stage.
- They will apply the skills in Activity 1 and 2 to design and create their own project, including sequences, sprites with costumes, and multiple backdrops.

**WALT: create a project from a task description**

- In this lesson, learners will create a musical instrument in Scratch.
- They will apply the concept of design to help develop programs and use programming blocks — which they have been introduced to throughout the unit.
- They will learn that code can be copied from one sprite to another, and that projects should be tested to see if they perform as expected.



## Spring 1 – Data and Information – Branching Databases

WALT: create questions with yes/no answers

- Learners will start to explore questions with yes/no answers, and how these can be used to identify and compare objects.
- They will create their own yes/no questions, before using these to split a collection of objects into groups.

WALT: identify the attributes needed to collect data about an object

- Learners will develop their understanding of using questions with yes/no answers to group objects more than once.
- They will learn how to arrange objects into a tree structure and will continue to think about which attributes the questions are related to.

WALT: create a branching database

- Learners will continue to develop their understanding of ordering objects/images in a branching database structure.
- They will learn how to use an online database tool to arrange objects into a branching database, and will create their own questions with yes/no answers.
- Learners will show that their branching database works through testing.

WALT: explain why it is helpful for a database to be well structured

- Learners will continue to develop their understanding of how to create a well-structured database.
- They will use attributes to create questions with yes/no answers, and will apply these to given objects.
- Learners will compare the efficiency of different branching databases, and will be able to explain why questions need to be in a specific order.

WALT: plan the structure of a branching database

- Learners will independently plan a branching database by creating a physical representation of one that will identify different types of dinosaur.
- They will continue to think about the attributes of objects to write questions with yes/no answers, which will enable them to separate a group of objects effectively.
- Learners will then arrange the questions and objects into a tree structure, before testing the structure.

WALT: independently create an identification tool

- Learners will independently create a branching database to identify different types of dinosaur, based on the paper-based version that they created in Lesson 5.
- They will then work with a partner to test that their database works, before considering real-world applications for branching databases.

## Spring 2 – Computing Systems and Networks – Connecting Computers

WALT: explain how digital devices function

- This lesson introduces the concepts of input, process, and output and how to protect devices using secure passwords. These concepts are fundamental to all digital devices.

WALT: identify input and output devices

- Learners will develop their knowledge of the relationship between inputs, processes, and outputs and apply it to devices and parts of devices that they will be familiar with from their everyday surroundings.

WALT: recognise how digital devices can change the way that we work



- Learners will apply their learning from Lessons 1 and 2 by using programs in conjunction with inputs and outputs on a digital device. They will create two pieces of work with the same focus, using digital devices to create one piece of work, and non-digital tools to create the other. Learners will then compare and contrast the two approaches.

WALT: explain how a computer network can be used to share information

- Many digital devices are now connected to other digital devices, e.g. computers through wires, tablets through Wi-Fi, and smartphones through mobile phone networks.
- The benefit of connecting digital devices is that it allows information to be shared between users and systems.

WALT: explore how digital devices can be connected

- This lesson introduces key network components, including a server and wireless access points.
- Learners will examine each device's functionality and look at the benefits of networking computers.

WALT: recognise the physical components of a network

- Learners will further develop their understanding of computer networks.
- They will see examples of network infrastructure in a real-world setting and relate them to the activities in Lesson 5.

## Summer 1 – Creating Media – What is 3D Printing?

WALT: understand how a 3D printer works

- Learners will learn what 3D printing is and its current various uses.
- They will have an example of 3D printing demonstrated to them.
- Learners will then log into TinkerCAD and explore some of its functionalities.

WALT: move objects in a 3D space effectively

- In this lesson, learners will learn how to move objects along an XYZ axis.
- They will explore how mouse keys are used to manipulate objects as well as how to insert and move objects.

WALT: manipulate objects

- In this lesson, learners will learn how to resize, apply bevels and rotate an object.

WALT: use the scribble and scribe tool

- Learners will learn how to use the Scribble and scribe tool in order to transform a 2D shape into a 3D model.

WALT: apply or knowledge of TinkerCAD

- In preparation for lesson 6, learners will create a simple 3D model to then be printed employing what they have learnt so far.

WALT: make and export an Egyptian Cartouche

- Finally, learners will use all their knowledge to create a 3D model of a specified object.

## Summer 2 – Programming B – Debugging Robot Algorithms

WALT: explain how a sprite moves in an existing project

- In this lesson, learners will investigate how characters/dash robots can be moved using 'events'.
- They will analyse and improve an existing project, and then apply what they have learned to their programming.

WALT: debug algorithms

- In this lesson, learners will understand the importance of a methodical approach when debugging algorithms and apply this system to new code.

WALT: use decomposition to solve a maze accurately and efficiently



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| <ul style="list-style-type: none"><li>• This lesson will use their knowledge of decomposition to break down a task into smaller, workable chunks to solve a maze.</li><li>• They will compare the similarities and differences between groups, checking for accuracy and efficiency.</li></ul>                     |
| <p><u>WALT: use measuring devices to create a maze to solve</u></p> <ul style="list-style-type: none"><li>• Following on from last lesson, children will create mazes by applying their understanding of length and perimeter, and angles, using rulers.</li><li>• Learners will continue to debug code.</li></ul> |
| <p><u>WALT: solve a maze by creating an algorithm</u></p> <ul style="list-style-type: none"><li>• Learners will solve their mazes using their knowledge of length and angles.</li><li>• Learners to focus on decomposition and debugging.</li></ul>  |
| <p><u>WALT: evaluate their algorithm's effectiveness</u></p> <ul style="list-style-type: none"><li>• Learners will watch their mazes and evaluate their final outcomes.</li><li>• Learners to complete their summative assessment.</li></ul>   |

# Year 4

## Autumn 1 –

### Programming A – Repetition in Shapes

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| <p><u>WALT: identify that accuracy in programming is important</u></p> <ul style="list-style-type: none"><li>• After being introduced to Dash Robots last year, children will further their understanding this unit.</li><li>• Learners will recap the inputs and outputs, decomposition, and how to debug their code using a systemic approach.</li></ul>   |
| <p><u>WALT: create an algorithm to make a Dash Robot draw a precise outcome</u></p> <ul style="list-style-type: none"><li>• In this lesson, pupils will create algorithms (a precise set of ordered instructions, which can be turned into code) for their initials.</li><li>• They will then implement these algorithms by writing them use the pen with a Dash robot commands to draw the letter.</li><li>• They will debug their code by finding and fixing any errors that they spot.</li></ul>  |
| <p><u>WALT: explain what 'repeat' means</u></p> <ul style="list-style-type: none"><li>• In this lesson, pupils will first look at examples of patterns in everyday life.</li><li>• They will recognise where numbers, shapes, and symbols are repeated, and how many times repeats occur.</li><li>• They will create algorithms for drawing a square, using the same annotated diagram as in Lesson 2.<ul style="list-style-type: none"><li>• They will use this algorithm to program a square the 'long' way, and recognise the repeated pattern within a square. Once they know the repeated pattern, they will use the repeat command within Logo to program squares the 'short' way.</li></ul></li></ul> |
| <p><u>WALT: modify a count-controlled loop to produce a given outcome</u></p> <ul style="list-style-type: none"><li>• In this lesson, pupils will work with count-controlled loops in a range of contexts.</li><li>• First, they will think about a real-life example, then they will move on to using count-controlled loops in regular 2D shapes.<ul style="list-style-type: none"><li>• They will trace code to predict which shapes will be drawn, and they will modify existing code by changing values within the code snippet.</li></ul></li></ul>  |
| <p><u>WALT: decompose a task into small steps</u></p> <ul style="list-style-type: none"><li>• In this lesson, pupils will focus on decomposition.</li><li>• They will break down everyday tasks into smaller parts and think about how code snippets can be broken down to make them easier to plan and work with.</li></ul>   |



- They will learn to create, name, and call procedures using the Dash Robot, which are code snippets that can be reused in their programming.

WALT: create a program that uses count-controlled loops to produce a given outcome

- In the final lesson, pupils will apply the skills that they have learnt in this unit to create a program containing a count-controlled loop.
- Over the course of the lesson, they will design wrapping paper using more than one shape, which they will create with a program that uses count-controlled loops.
- They will begin by creating the algorithm, either as an annotated sketch, or as a sketch and algorithm, and then implement it as code.
  - They will debug their work throughout, and evaluate their programs against the original brief.

## Autumn 2 – Data and Information – Data Logging

WALT: To explain that data gathered over time can be used to answer questions

- Learners will consider what data can be collected and how it is collected.
- They will think about data being collected over time.
- Learners will also think about questions that can and can't be answered using available data, and reflect on the importance of collecting the right data to answer questions.

WALT: use a digital device to collect data automatically

- Learners will build on the idea of collecting data over time, and be introduced to the idea of collecting data automatically using computers such as data loggers.
- They will also be introduced to the concept that computers can capture data from the physical world using input devices called 'sensors'.
- Learners will establish that sensors can be connected to data loggers, which can automatically collect data while not attached to a computer.

WALT: explain that a data logger collects 'data points' from sensors over time

- Learners will explore how data loggers work.
- They will record data at set moments in time and draw parallels with the data points that a data logger captures at regular intervals.
- Learners will understand the importance of chosen time intervals

WALT: recognise how a computer can help us analyse data

- Learners will open an existing data file and use software to find out key information.
- They will analyse a data file which is a five-hour log of hot water cooling to room temperature.

WALT: identify the data needed to answer questions

- Learners will think about questions that can be answered using collected data.
- They will choose a question to focus on and then plan the data logging process that they need to complete.
- After learners have completed their plan, they will set up the data loggers to check that their plan will work.
- This setting up is designed to ensure that the data collection will work, and that learners will have data to use in the next lesson.

WALT: use data from sensors to answer questions

- Learners will access and review the data that they have collected using a data logger.
- They will then use the data collected to answer the question that they selected in the previous lesson. Learners will also reflect on the benefits of using a data logger.

## Spring 1 – Creating Media – 3D Printing a Key Chain



WALT: explore real world uses of 3D Printing

- Building on their learning from Year 3, learners will explore further applications of 3D printing as well as possible future uses and how it may impact other industries.

WALT: manipulate and move objects in a 3D space

- Learners will continue to progress their knowledge of manipulating objects in TinkerCAD, this time applying further precision and detailing.

WALT: use multiple shapes to create new shapes

- Learners will focus on joining shapes, applying extruding designs, creating holes to create more complex designs.

WALT: use detailed measurements and a design criteria to design a key chain

- Learners will be tasked to create a model following strict criteria.
- Parameters will need to be followed strictly in order for the 3D model to be functional.

WALT: create a key chain in TinkerCAD

- Learners will then employ what they have learnt in an independent attempt at creating a key chain.

WALT: create, export and print a key chain from TinkerCAD

- Finally, learners will print their key chain.

## Spring 2 – Computing Systems and Networks – The Internet

WALT: To describe how networks physically connect to other networks

- Learners will explore how a network can share messages with another network to form the internet.
- They will consider some of the network devices involved in this, such as routers, and will also discuss what should be kept in and out of a network to keep safe.

WALT: recognise how networked devices make up the internet

- Learners will describe the parts of a network and how they connect to each other to form the internet.
- They will use this understanding to help explain how the internet lets us view the World Wide Web and recognise that the World Wide Web is part of the internet which contains websites and web pages.

WALT: outline how websites can be shared via the World Wide Web (WWW)

- Learners will explore what can be shared on the World Wide Web and where websites are stored.
- They will also explore how the World Wide Web can be accessed on a variety of devices.

WALT: describe how content can be added and accessed on the World Wide Web (WWW)

- Learners will analyse a website and identify the key parts.
- They will then consider what content can be added to websites and what factors they should consider before adding content to a website.
- Finally, they will use a website which enables them to create their own content online.

WALT: recognise how the content of the WWW is created by people

- Learners will explore who owns the content on the World Wide Web (or 'web' for short).
- They will explore a variety of websites and will investigate what they can and cannot do with the content on them.
- They will also relate this to principles of ownership and sharing in the real world.

WALT: evaluate the consequences of unreliable content

- Learners will gain an appreciation of the fact that not everything they see on the internet is true, honest, or accurate.
- They will review images and decide whether or not they are real, before looking at why web searches can return ambiguous (and sometimes misleading) results.



- Finally, learners will complete a practical activity, demonstrating how quickly information can spread beyond their control.

## Summer 1 – Creating Media – Photo Editing

WALT: explain that the composition of digital images can be changed

- In this lesson, you will introduce learners to the concept of editing images.
- They will go on to explore when we need to rotate and crop an image as well as how to use an image editor to make these changes. Learners will then discuss image composition.

WALT: explain that colours can be changed in digital images

- In this lesson, learners will look at the effect that different colours and filters can have on an image.
- They will choose appropriate effects to fit a scenario, and explain how they made their choices.
- They will then edit the images using different effects to suit two different scenarios.

WALT: explain how cloning can be used in photo editing

- In this lesson, learners will be introduced to the cloning tool and its use in both changing the composition of a photo and photo retouching.
- They will see how parts of a photo can be removed or duplicated using cloning. Learners will consider what parts of an image can be retouched and learn techniques to make this as unnoticeable as possible.
- Finally, they will consider when it is necessary to edit photographs in this way.

WALT: explain that images can be combined

- In this lesson, students learn how to use different tools to select areas of an image.
- Learners then use copy and paste within one image and between two images to produce a combined image.
- Finally, learners will consider when it's appropriate to edit an image and discuss some of the ethics around retouching photos.

WALT: combine images for a purpose

- In this lesson, learners will apply all the skills they have learnt in the unit so far.
- They will start by reviewing some images and considering what makes an image look real or made up.
- Learners will then plan their own image.
- They will choose from a selection of images, open them and edit them to create their own project.

WALT: evaluate how changes can improve an image

- This lesson is the final lesson in the unit on photo editing.
- Learners will review the image that they created in Lesson 5.
- After they have reviewed their image, they will have the opportunity to make changes to their image based on their review.
- Learners will then add text to their image to complete it as a publication.

## Summer 2 – Programming B – Repetition in Games

WALT: develop the use of count-controlled loops in a different programming environment

- In the first lesson, learners look at real-life examples of repetition, and identify which parts of instructions are repeated.
- Learners then use Scratch, a block-based programming environment, to create shapes using count-controlled loops.
- They consider what the different values in each loop signify, then use existing code to modify and create new code, and work on reading code and predicting what the output will be once the code is run.



WALT: explain that in programming there are infinite loops and count-controlled loops

- In this lesson, learners look at different types of loops: infinite loops and count-controlled loops.
- They practise using these within Scratch and think about which might be more suitable for different purposes.

WALT: develop a design that includes two or more loops which run at the same time

- In this lesson, learners create designs for an animation of the letters in their names.
- The animation uses repetition to change the costume (appearance) of the sprite. The letter sprites will all animate together when the **event** block (**green flag**) is clicked.
- When they have designed their animations, the learners will program them in Scratch.
- After programming, learners then evaluate their work, considering how effectively they used repetition in their code.

WALT: modify an infinite loop in a given program

- In this lesson, learners look at an existing game and match parts of the game with the design.
- They make changes to a sprite in the existing game to match the design.
- They then look at a completed design, and implement the remaining changes in the Scratch game.
- They add a sprite, re-use and modify code blocks within loops, and explain the changes made.

WALT: design a project that includes repetition

- In this lesson, learners look at a model project that uses repetition.
- They then design their own games based on the model project, producing designs and algorithms for sprites in the game.
- They share these designs with a partner and have time to make any changes to their design as required.

WALT: create a project that includes repetition

- In this lesson, learners build their games, using the designs they created in Lesson 5.
- They follow their algorithms, fix mistakes, and refine designs in their work as they build.
- They evaluate their work once it is completed, and showcase their games at the end.

# Year 5

## Autumn 1 –

### Programming A – Selection in Physical Computing

WALT: To control a simple circuit connected to a computer

- In this lesson, your learners will become familiar with the Crumble controller and the programming environment used to control it.
- Learners will connect a Sparkle to a Crumble and then program the Crumble to make the Sparkle flash different colour patterns.
- Learners will also use infinite loops, which were introduced to the learners in the previous school year.

WALT: write a program that includes count-controlled loops

- In this lesson, learners will connect a Sparkle and a motor to the Crumble controller.
- Learners will design sequences of actions for these components.
- They will then apply their understanding of repetition by using count-controlled loops when implementing their design as a program.

WALT: explain that a loop can stop when a condition is met



- In this lesson, learners will be introduced to conditions, and how they can be used in programs to control their flow.
- They will identify conditions in statements, stating if they are true or false.
- Learners will be introduced to a Crumble switch, and learn how it can provide the Crumble controller with an input that can be used as a condition.
- They will explore how to write programs that use an input as a condition.

WALT: explain that a loop can be used to repeatedly check whether a condition has been met

- In this lesson, learners will develop their understanding of how the flow of actions in algorithms and programs can be controlled by conditions.
- They will be introduced to selection and then represent conditions and actions using the 'if...then...' structure.
- Learners will create algorithms that include selection. They will use their algorithms to guide their program writing.
- Learners will see that infinite repetition is required to repeatedly check if a condition has been met.

WALT: design a physical project that includes selection

- In this lesson, learners will apply their understanding of microcontrollers and selection when designing a project to meet the requirements of a given task.
- To support their understanding, learners will identify how selection might be used in real-world situations, then they will consider how they can apply this knowledge to design their project.
- Learners will produce design sketches to show how their model will be made and how they will connect the microcontroller to its components.

WALT: create a program that controls a physical computing project

- In this final lesson of the unit, learners will develop Crumble programs to control the model of a fairground ride they built in Lesson 5.
- First, learners will identify how they are going to use selection before writing an algorithm to meet the requirements of the given task.
- They will then implement their algorithms as code.
- Learners will run their programs to identify any bugs, and then return to the code or algorithm to debug it where necessary.
- Finally, to conclude the unit, learners will evaluate their designs.

## Autumn 2 – Creating Media – Moving Toys (3D Printing)

Note: this unit complements the DT unit –  
WALTS below are for both Computing and DT.

WALT explore moving toys

- Checks made on ensuring prior knowledge is known
- Related products are explored with diagrams drawn to label key components

WALT understand the effects of a cam

- Children to understand that a cam is a linkage system which has a follower to convert rotary movement to linear movement.
- Children to explore the effect of different shape cams and the associated movement to the follower

WALT: Recap our 3D design skills

- Logging into TinkerCAD, manipulating, moving etc.
- Start a print in the lesson so children can see the process



WALT: design a moving toy using a cam

- Share design problem
- Share design brief template and complete with children
- Must include a 3d printed part

WALT: model our design in CAD software

- 2 Lessons

WALT: design part of my moving toy in TinkerCAD

WALT: 3D print part of my moving toy

- Exporting and printing
- 2 Lessons

WALT: make a moving toy using a cam

- 2 Lessons

WALT evaluate a moving toy using a cam

- Revisit design problem and brief
- Model completion of star diagram for evaluation
- Model explanation of thoughts: evaluate ideas and products against design criteria and consider views of others to improve work
- explain effectiveness of design choices based on the properties of materials and choice of joining

## Spring 1 –

### Data and Information – Flat-File Databases

WALT: use a form to record information

- In this lesson, learners will create a paper version of a record card database.
- Using a card template, they will create a data set, with each learner creating eight to ten cards linked to a theme, e.g. animals.
  - They will complete records for each of the animals in their database and then they will physically sort the cards to answer questions about the data

WALT: compare paper and computer-based databases

- In this lesson, learners will use a computer-based database to examine how data can be recorded and viewed.
- They will learn that a database consists of 'records', and that each record contains 'fields'.
  - In addition, they will order records in different ways and compare this database to the paper database they created in Lesson 1.

WALT: outline how you can answer questions by grouping and then sorting data

- In this lesson, learners will investigate how records can be grouped, using both the paper record cards created in Lesson 1 and a computer-based database from J2E.
  - They will use 'grouping' and 'sorting' to answer questions about the data.

WALT: explain that tools can be used to select specific data

- In this lesson, learners will develop their search techniques to answer questions about the data.
- They will use advanced techniques to search for more than one field, and will practise doing this through both unplugged methods (without using computers), and using a computer database.

WALT: explain that computer programs can be used to compare data visually

- In this lesson, learners will consider what makes a useful chart, and how charts can be used to compare data.
- They will create charts from their data in order to answer questions about it.



WALT: use a real-world database to answer questions

- The final lesson requires learners to use a real-life database to ask questions and find answers in the context of a flight search based on set parameters.
- They will take on the role of a travel agent and present their findings, showing how they arrived at their chosen options.
- Presentations may be given between groups of learners, or by each group to the whole class, depending on the time available/

## Spring 2 – Computing Systems and Networks – Sharing Information

WALT: explain that computers can be connected together to form systems

- Learners are introduced to the concept of a system.
- They begin to understand that components can work together to perform a task.
- Finally, learners explore how digital systems can work and learn about physical and electronic connections.

WALT: recognise the role of computer systems in our lives

- Learners consider how larger computer systems work.
- They see how devices and processes are connected, and reflect on how computer systems can help them.

WALT: identify how to use a search engine

- Learners are introduced to a range of search engines.
- They are given the opportunity to explain how to search, before they write and test instructions.
- Next, they learn that searches do not always return the results that someone is looking for, and refine their searches accordingly.
- Finally, learners are introduced to the two most common methods of searching: using a search engine and using the address bar.

WALT: describe how search engines select results

- Learners gain an understanding of why search engines are necessary to help them find things on the World Wide Web.
- They conduct their own searches and break down, in detail, the steps needed to find things on the web.
- Learners then emulate web crawlers to create an index of their own classroom.
  - Finally, they consider why some searches return more results than others.

WALT: explain how search results are ranked

- Learners take part in an unplugged activity to find out about how a webpage's content can influence where it is ranked in search results.
- In groups, learners create paper-based webpages on a topic that they are familiar with.
- They then discover how their webpages would rank when searching for keywords relating to their content.

WALT: recognise why the order of results is important, and to whom

- Learners explore how someone performing a web search can influence the results that are returned, and how content creators can optimise their sites for searching.
- They also explore some of the limitations of searching and discuss what cannot be searched.

## Summer 1 – Creating Media – Video Editing

WALT: explain what makes a video effective



- Learners will be introduced to video as a media format.
- They will see examples of videos featuring production and editing techniques that they will work towards using their own videos.
- Learners will begin by explaining what the medium of video is before analysing and comparing examples of videos.

WALT: use a digital device to record video

- Learners will explore the capabilities of a digital device that can be used to record video.
- Once they are familiar with their device, learners will experiment with different camera angles, considering how different camera angles can be used for different purposes.

WALT: capture video using a range of techniques

- Learners will use a storyboard to explore a variety of filming techniques, some of which they will use in their own video project later in the unit.
- They will evaluate the effectiveness of these techniques before offering feedback on others' work.

WALT: create a storyboard

- Learners will plan a video by creating a storyboard.
- Their storyboard will describe each scene, and will include a script, camera angles, and filming techniques.
- Learners will use their storyboards to film the first scene of their videos.

WALT: identify that video can be improved through reshooting and editing

- Learners will film the remaining scenes of their video, and then import their content to video editing software.
- They will then explore key editing techniques and decide whether sections of their video can be edited or need to be shot again.

WALT: consider the impact of the choices made when making and sharing a video

- Learners will complete their video by removing unwanted content and reordering their clips.
- They will then export their finished video and evaluate the effectiveness of their edits.
- Finally, they will consider how they could share their video with others.

## Summer 2 – Programming B – Selection in Quizzes

WALT: explain how selection is used in computer programs

- In this lesson, learners revisit previous learning on 'selection' and identify how 'conditions' are used to control the flow of actions in a program.
- They are introduced to the blocks for using conditions in programs using the Scratch programming environment.
- They modify the conditions in an existing program and identify the impact this has.

WALT: relate that a conditional statement connects a condition to an outcome

- In this lesson, learners will develop their understanding of selection by using the 'if... then... else...' structure in algorithms and programs.
- They will revisit the need to use repetition in selection to ensure that conditions are repeatedly checked.
- They identify the two outcomes in given programs and how the condition informs which outcome will be selected.
- Learners use this knowledge to write their own programs that use selection with two outcomes.

WALT: explain how selection directs the flow of a program

- In this lesson, learners consider how the 'if... then... else...' structure can be used to identify two responses to a binary question (one with a 'yes or no' answer).



- They identify that the answer to the question is the 'condition', and use algorithms with a branching structure to represent the actions that will be carried out if the condition is true or false.
- They learn how questions can be asked in Scratch, and how the answer, supplied by the user, is used in the condition to control the outcomes.
- They use an algorithm to design a program that uses selection to direct the flow of the program based on the answer provided.
- They implement their algorithm as a program and test whether both outcomes can be achieved.

WALT: design a program that uses selection

- In this lesson, learners will be provided with a task: to use selection to control the outcomes in an interactive quiz.
- They will outline the requirements of the task and use an algorithm to show how they will use selection in the quiz to control the outcomes based on the answer given.
- Learners will complete their designs by using design templates to identify the questions that will be asked, and the outcomes for both correct and incorrect answers.
- To demonstrate their understanding of how they are using selection to control the flow of the program, learners will identify which outcomes will be selected based on given responses.

WALT: create a program that uses selection

- In this lesson, learners will use the Scratch programming environment to implement the first section of their algorithm as a program.
- They will run the first section of their program to test whether they have correctly used selection to control the outcomes, and debug their program if required.
- They will then continue implementing their algorithm as a program.
- Once completed, they will consider the value of sharing their program with others so that they can receive feedback.
- Learners conclude the lesson by using another learner's quiz and providing feedback on it.

WALT: evaluate my program

- In this lesson, learners will return to their completed programs and identify ways in which the program can be improved.
- They will focus on issues where answers similar to those in the condition are given as inputs, and identify ways to avoid such problems.
- Learners will also consider how the outcomes may change the program for subsequent users, and identify how they can make use of 'setup' to provide all users with the same experience.
- They will implement their identified improvements by returning to the Scratch programming environment and adding to their programs.
- They conclude the unit by identifying how they met the requirements of the given task, and identifying the aspects of the program that worked well, those they improved, and areas that could improve further.

# Year 6

## Autumn 1 –

### Creating Media – Web Page Creation

WALT: To review an existing website and consider its structure

- In this lesson, learners will explore and review existing websites and evaluate their content.
  - They will have some understanding that websites are created by using HTML code.

WALT: plan the features of a web page



- Learners will look at the different layout features available in Google Sites and plan their own web page on paper.

WALT: consider the ownership and use of images (copyright)

- During this lesson learners will become familiar with the terms 'fair use' and 'copyright'.
- They will gain an understanding of why they should only use copyright-free images and will find appropriate images to use in their work from suggested sources.

WALT: recognise the need to preview pages

- Today learners will revise how to create their own web page in Google Sites.
- Using their plan from previous lessons, learners will create their own web page/home page.
  - They will preview their web page as it will appear on different devices and suggest or make edits to improve the user experience on each device.

WALT: outline the need for a navigation path

- During this lesson learners will begin to appreciate the need to plan the structure of a website carefully.
- They will plan their website, paying attention to the navigation paths (the way that pages are linked together).
- They will then create multiple web pages for their site and use hyperlinks to link them together as detailed in their planning.

WALT: recognise the implications of linking to content owned by other people

- Learners will consider the implications of linking to content owned by other people and create hyperlinks on their own websites that link to other people's work.
- They will then evaluate the user experience when using their own website and that of another learner.

## Autumn 2 – Programming B – Creating Real World Appliances Using Sensors (with DT)

Note: this unit complements the DT unit –  
WALTS below are for both Computing and DT.

WALT: write a program using appropriate inputs

- Learners will be recapping using crumbles from year 5.
- Focusing on inputs, outputs, debugging, abstraction and decomposition.

WALT: write a program that include count-controlled loops

- Learners will use loops and repeats to use accessories to the crumbles when certain conditions have been met.

WALT: connect and program sensors attached to crumbles

- Learners will initially use the buttons to change the value of a variable using selection.
- They will then develop their programs to update the variable by moving their micro:bit using the accelerometer to sense motion.
  - Finally, they will learn that a variable's value remains the same after it has been checked by the program.

WALT: use sensors to stop loops when conditions are met

- Learners will apply their understanding of the importance of order in programs.
- They will then use operands in selection to determine the flow of a program.
- Learners will begin to programme their crumble to fit with their design brief.

WALT: design a real-world project that uses a controllable device

- After finalising their code, and debugging any errors, children will create the final design of their project, using the appropriate DT skills.

WALT: create and programme a project that uses a controllable device



- Learners will then create their own code designed to affect a program on their chosen appliance.
- This will then be programmed onto the micro:bit.

WALT: make and finalise the design of our project

- Learners will attach their micro:bit to their appliance, ensuring it runs as programmed.
- Any errors can be debugged at this point.

WALT: present and evaluate my project

- Learners will present their project to the class, focusing on the design brief, challenges and successes, final outcome, and what they would change next time.

## Spring 1 – Programming A – Variables in Games

WALT: To define a 'variable' as something that is changeable

- Learners are introduced to variables.
- They see examples of real-world variables (score and time in a football match) before they explore them in a Scratch project.
- Learners then design and make their own project that includes variables.
- Finally, learners identify that variables are named and that they can be letters (strings) as well as numbers.

WALT: explain why a variable is used in a program

- Learners understand that variables are used in programs, and that they can only hold a single value at a time.
- They complete an unplugged task that demonstrates the process of changing variables.
- Then, learners explore why it is important to name variables and apply their learning in a Scratch project in which they make, name, and update variables.

WALT: choose how to improve a game by using variables

- Learners apply the concept of variables to enhance an existing game in Scratch.
- They predict the outcome of changing the same change score block in different parts of a program, then they test their predictions in Scratch.
- Learners also experiment with using different values in variables, and with using a variable elsewhere in a program.
- Finally, they add comments to their project to explain how they have met the objectives of the lesson.

WALT: design a project that builds on a given example

- Learners work at the 'design' level of abstraction, where they create their artwork and algorithms.
- Learners first design the sprites and backgrounds for their project, then they design their algorithms to create their program flow.

WALT: use my design to create a project

- Learners implement the algorithms that they created in Lesson 4.
- In doing this, they identify variables in an unfamiliar project and learn the importance of naming variables.
- They also have the opportunity to add another variable to enhance their project.

WALT: evaluate my project

- Learners build on the project that they created in Lesson 5.
- They consider how they could improve their own projects and make small changes to achieve this.
- Learners then have the opportunity to add a variable independently.
- Finally, learners evaluate each other's projects; they identify features that they liked and features that could be improved.



## Spring 2 – Computing Systems and Networks - Communication

### WALT: explain the importance of internet addresses

- Learners explore what is necessary for effective communication and the importance of agreed protocols.
- They apply this understanding to IP addresses and the rules (protocols) that computers have for communicating with one another.
- Learners also use a Domain Name Server (DNS) to translate web addresses into IP addresses.

### WALT: recognise how data is transferred across the internet

- Learners are introduced to the concept of packets.
- They complete an activity based on transferring an image across the internet, to see that as well as messages (text), other types of data (images, video, and audio) are also transferred over the internet.
- They gain an understanding of the key parts of a packet: the header and the data payload.

### WALT: explain how sharing information online can help people to work together

- Learners consider how people can work together when they are not in the same location.
- They discuss ways of working and complete a collaborative online project.
- The online activity assumes that learners can make simple slides, including text and images.

### WALT: evaluate different ways of working together online

- Learners are introduced to another approach to online working: reusing and modifying work done by someone else.

### WALT: recognise how we communicate using technology

- Learners deepen their understanding of the term 'communication'.
- They explore different methods of communication, before they consider internet-based communication in more detail.
- Finally, learners evaluate which methods of communication suit particular purposes.

### WALT: evaluate different methods of online communication

- Learners use information provided in the lesson and their own prior knowledge to categorise different forms of internet communication.
- They then choose which method(s) they would use for the scenarios discussed in the previous lesson.
- Through these activities, learners explore issues around privacy, information security and how to report concerns about inappropriate content online.

## Summer 1 – Creating Media – 3D Modelling using Code

### WALT: apply our knowledge of block coding in new software

- Combining both their knowledge of Scratch and TinkerCAD, learners will now use code rather than model in TinkerCAD.
- They will explore how they can use code to measure progress and identify errors to be debugged.

### WALT: practise skills to code a pencil pot

- Learners will be given the chance to explore employing more complex code to create a sophisticated object, noting what they will need for the following lesson.

### WALT: use a design criterion to plan a pencil pot

- Learners will focus on coding a pencil pot to specific dimensions and combining the appropriate shapes.

### WALT: code our pencil pot design



- In this first lesson, learners will begin to code their pencil pot design.

WALT: code our pencil pot design

- Learners will finish coding their pencil pot design.

WALT: 3D print our pencil pot design

- Learners will watch their 3D pencil pot designs printed.

## **Summer 2 – Data and Information - Spreadsheets**

WALT: create a data set in a spreadsheet

- Learners will collect and organise data in a format of their choice.
- They will then explore how data can be structured in a table. Finally they will input data into a spreadsheet.

WALT: build a data set in a spreadsheet

- Learners will develop their understanding of the structure of a spreadsheet.
- They will be introduced to cell references, data items and the concept of formatting cells.
- Learners will see data items formatted in different ways, they will then choose formats for data items before applying formats in their own spreadsheet.

WALT: explain that formulas can be used to produce calculated data

- Learners will begin to use formulas to produce calculated data.
- They will understand that the type of data in a cell is important (e.g. numbers can be used in calculations whereas words cannot).
- Learners will create formulas to use in a spreadsheet using cell references and identify that changing inputs will change the output of the calculation.

WALT: apply formulas to data

- Learners will calculate data using the operations of multiplication, subtraction, division, and addition.
- They will use these operations to create formulas in a spreadsheet.
- Learners will then begin to understand the importance of creating formulas that include a range of cells and the advantage of duplicating in order to apply formulas to multiple cells.

WALT: create a spreadsheet to plan an event

- Learners will plan and calculate the cost of an event using a spreadsheet.
- They will use a predefined list to choose what they would like to include in their event, and use their spreadsheet to answer questions on the data they have selected.
- Learners will be reminded of the importance of organising data and will then create a spreadsheet using formulas to work out costs for their event.

WALT: choose suitable ways to present data

- Learners will gain skills to create charts in Google Sheets.
- They will evaluate the results from their charts to answer questions.
- Finally, learners will show they understand that there are different software tools available within spreadsheet applications to present data.



# Computing Topic Overview

## Cross-Curricular Links

| Computer Systems and Networks |   |  |  |   |  |  |
|-------------------------------|---|--|--|---|--|--|
| Creating Media                |   |  |  |   |  |  |
| Programming A                 |   |  |  |   |  |  |
| Data and Information          |   |  |  |   |  |  |
| Programming B                 |   |  |  |   |  |  |
|                               | Autumn 1  | Autumn 2   | Spring 1   | Spring 2  | Summer 1   | Summer 2   |
| Year 1                        | <p><b><u>Digital Painting</u></b><br/>Choosing appropriate tools in a program to create art, and making comparisons with working non-digitally.</p> | <p><b><u>Moving a Robot</u></b><br/>Writing short algorithms and programs for floor robots, and predicting program outcomes.</p> | <p><b><u>Grouping Data</u></b><br/>Exploring object labels, then using them to sort and group objects by properties.<br/><br/>Link: Maths – Autumn 2 Shape</p>       | <p><b><u>Technology around us</u></b><br/>Recognising technology in school and using it responsibly</p>   | <p><b><u>Digital Writing</u></b><br/>Using a computer to create and format text, before comparing to writing non-digitally</p>           | <p><b><u>Programming Animations</u></b><br/>Designing and programming the movement of a character on screen to tell stories.</p>                         |
| Year 2                        | <p><b><u>Robot Algorithms</u></b><br/>Creating and debugging programs and using logical reasoning to make predictions.</p>                          | <p><b><u>Digital Photography</u></b><br/>Capturing and changing digital photographs for different purposes.</p>                  | <p><b><u>Information technology around us</u></b><br/>Identifying IT and how its responsible use improves our world in school and beyond.</p>                        | <p><b><u>Pictograms</u></b><br/>Collecting data in tally charts and using attributes to organise and present data on a computer.<br/><br/>Link: Maths – Spring 1 Statistics</p> | <p><b><u>Making Music</u></b><br/>Using a computer as a tool to explore rhythms and melodies, before creating a musical composition.</p> | <p><b><u>Programming Quizzes</u></b><br/>Designing algorithms and programs that use events to trigger sequences of code to make an interactive quiz.</p> |
| Year 3                        | <p><b><u>Stop-Frame Animation</u></b><br/>Capturing and editing digital still images to produce a stop-frame animation that tells a story.</p>      | <p><b><u>Sequencing Sounds</u></b><br/>Creating sequences in a block-based programming language to make music.</p>               | <p><b><u>Branching Databases</u></b><br/>Building and using branching databases to group objects using yes/no questions.<br/><br/>Link: Science – Autumn 2 Rocks</p> | <p><b><u>Connecting computers</u></b><br/>Identifying that digital devices have inputs, processes, and outputs, and how devices can be connected to make networks</p>           | <p><b><u>What is a 3D Printing?</u></b><br/>Using TinkerCAD and designing and Egyptian cartouche to print.</p>                           | <p><b><u>Debugging Robot Algorithms DASH ROBOTS</u></b><br/>Writing and debugging algorithms to control a Dash Robot.</p>                                |
| Year 4                        | <p><b><u>Repetition in Shapes DASH ROBOTS</u></b></p>   | <p><b><u>Data Logging</u></b><br/>Recognising how and why data is</p>  | <p><b><u>3D Printing a Key Chain</u></b><br/>Using TinkerCAD</p>   | <p><b><u>The Internet</u></b><br/>Recognising the internet as a network of</p>  | <p><b><u>Photo Editing</u></b><br/>Manipulating digital</p>  | <p><b><u>Repetition in Games</u></b><br/>Using a block-based</p>   |



|        |   |   |   |  |  |   |
|--------|---|---|---|--|--|---|
|        | Using a text-based programming language to explore count-controlled loops when drawing shapes using a Dash Robot.                 | collected over time, before using data loggers to carry out an investigation.<br><b>Link: Science – Spring 1 Sound</b>  | to design and print a personalised key chain.   | networks including the WWW, and why we should evaluate online content.   | images, and reflecting on the impact of changes and whether the required purpose is fulfilled.                                     | programming language to explore count-controlled and infinite loops when creating a game.   |
| Year 5 | <b><u>Selection in Physical Computing</u></b><br>Exploring conditions and selection using a programmable microcontroller.         | <b><u>Moving Toys (3D Printing)</u></b><br>Modelling a toy and design a part of the toy using TinkerCAD.<br><b>Link: DT</b>   | <b><u>Flat-File Databases</u></b><br>Using a database to order data and create charts to answer questions.<br><b>Link: Maths – Autumn 1 Graphs and Tables</b> | <b><u>Systems and Searching</u></b><br>Recognising IT systems around us and how they allow us to search the internet.                | <b><u>Video Production</u></b><br>Planning, capturing, and editing video to produce a short film.                                  | <b><u>Selection in Quizzes</u></b><br>Exploring selection in programming to design and code an interactive quiz.  |
| Year 6 | <b><u>Webpage Creation</u></b><br>Designing and creating webpages, giving consideration to copyright, aesthetics, and navigation. | <b><u>Creating Real World Appliances Using Sensors Crumbles</u></b><br>Designing and coding a project that captures inputs from a physical device.<br><b>Link: DT</b> | <b><u>Variables in Games</u></b><br>Exploring variables when designing and coding a game.   | <b><u>Communication and Collaboration</u></b><br>Identifying and exploring how data is transferred and information is shared online. | <b><u>3D Modelling using Code</u></b><br>Using their knowledge of block coding to design a pencil case using TinkerCAD codeblocks. | <b><u>Introduction to Spreadsheets</u></b><br>Answering questions by using spreadsheets to organise and calculate data.<br><b>Link: Maths – Spring 1 Measure.</b> |