COMPUTING KNOWLEDGE AND SKILLS PROGRESSION

	Year 1 & 2 Cycle A	Year 1 & 2 Cycle B	Year 3 & 4 Cycle A	Year 3 & 4 Cycle B	Year 5 & 6 Cycle A	Year 5 & 6 Cycle B
Computing Systems and Networks 		**Unit: Technology around us** **LO: 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 **LO: 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 **LO: 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 **LO: 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 **LO: 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 **LO: To create rules for using technology responsibly** • I can identify rules to keep us safe and healthy when we are using technology in		**Unit: Connecting Computers** **LO: to explain how digital devices function** • I can explain that digital devices accept inputs • I can explain that digital devices produce outputs • I can follow a process **LO: to identify input and output devices** • I can classify input and output devices • I can design a digital device • I can describe a simple process **LO: to recognise how digital devices can change the way we work** • I can explain how I use digital devices for different activities • I can recognise similarities between using digital devices and non-digital tools • I can suggest differences between using digital devices and non-digital tools **LO: to explain how a computer network can be used to share information** • I can recognise different connections • I can explain how messages are passed through multiple connections • I can discuss why we need a network switch **LO: to explore how digital devices can be connected** • I can recognise that a computer network is made up of a number of devices • I can demonstrate how information can be passed between devices • I can explain the role of a switch, server, and wireless access point in a network **LO: to recognise the physical components of a network** • I can identify how devices in a network are connected together • I can identify networked devices around me • I can identify the benefits of computer networks **Unit: The Internet** **LO: to describe how networks physically connect to other networks** • I can describe the internet as a network of networks • I can demonstrate how information is shared across the internet • I can discuss why a network needs protecting **LO: to recognise how networked devices make up the internet**		**Unit: Systems and Searching** **LO: to explain that computers can be connected together to form systems** • I can explain that systems are built using a number of parts • I can describe that a computer system features inputs, processes, and outputs • I can explain that computer systems communicate with other devices **LO: to recognise the role of computer systems in our lives** • I can identify tasks that are managed by computer systems • I can identify the human elements of a computer system • I can explain the benefits of a given computer system **LO: to experiment with search engines** • I can make use of a web search to find specific information • I can refine my web search • I can compare results from different search engines **LO: to describe how search engines select results** • I can explain why we need tools to find things online • I can recognise the role of web crawlers in creating an index • I can relate a search term to the search engine's index **LO: to explain how search results are ranked** • I can order a list by rank • I can explain that a search engine follows rules to rank results • I can give examples of criteria used by search engines to rank results **LO: to recognise why the order of results is important, and to whom** • I can describe some of the ways that search results can be influenced • I can recognise some of the limitations of search engines • I can explain how search engines make money **Unit: Communication and Collaboration** **LO: to explain the importance of internet addresses** • I can recognise that data is transferred using agreed methods • I can explain that internet devices have addresses • I can describe how computers use addresses to access websites **LO: to recognise how data is transferred across the internet** • I can identify and explain the main parts of a data packet

	and beyond the home • I can give examples of some of these rules • I can discuss how we benefit from these rules **<u>Unit: IT Around Us</u>** **LO: 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 **LO: 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 **LO: 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 **LO: 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 **LO: to explain how to use information technology safely** • I can list different uses of information technology		• I can describe networked devices and how they connect • I can explain that the internet is used to provide many services • I can recognise that the World Wide Web contains websites and web pages **LO: to outline how websites can be shared via the World Wide Web (WWW)** • I can describe where websites are stored when uploaded to the WWW • I can describe how to access websites on the WWW • I can explain the types of media that can be shared on the WWW **LO: to describe how content can be added and accessed on the World Wide Web (WWW)** • I can explain what media can be found on websites • I can recognise that I can add content to the WWW • I can explain that internet services can be used to create content online **LO: to recognise how the content of the WWW is created by people** • I can explain that websites and their content are created by people • I can suggest who owns the content on websites • I can explain that there are rules to protect content **LO: to evaluate the consequences of unreliable content** • I can explain that not everything on the World Wide Web is true • I can explain why some information I find online may not be honest, accurate, or legal I can explain why I need to think carefully before I share or reshare content		• I can explain that data is transferred over networks in packets • I can explain that all data transferred over the internet is in packets **LO: to explain how sharing information online can help people to work together** • I can recognise how to access shared files stored online • I can send information over the internet in different ways • I can explain that the internet allows different media to be shared **LO: to evaluate different ways of working together online** • I can identify different ways of working together online • I can recognise that working together on the internet can be public or private • I can explain how the internet enables effective collaboration **LO: to recognise how we communicate using technology** • I can explain the different ways in which people communicate • I can identify that there are a variety of ways to communicate over the internet • I can choose methods of communication to suit particular purposes **LO: to evaluate different methods of online communication** • I can compare different methods of communicating on the internet • I can decide when I should and should not share information online • I can explain that communication on the internet may not be private

		• I can talk about different rules for using IT • I can say how rules can help keep me safe **LO: 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				
Creating Media	**Unit: Digital Writing** **LO: to use a computer to write** • I can open a word processor • I can recognise keys on a keyboard • I can identify and find keys on a keyboard **LO: to add and remove text on a computer** • I can enter text into a computer • I can use letter, number, and space keys • I can use backspace to remove text **LO: to identify that the look of text can be changed on a computer** • I can type capital letters • I can explain what the keys that I have learnt about already do • I can identify the toolbar and use bold, italic, and underline **LO: to make careful choices when changing text** • I can select a word by double-clicking • I can select all of the text by clicking and dragging • I can change the font **LO: to explain why I used the tools that I chose**	**Unit: Digital Painting** **LO: 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 **LO: 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 **LO: 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 **LO: to explain why I chose the tools I used** • I know that different paint tools do different jobs	**Unit: Desktop Publishing** **LO: to recognise how text and images convey information** • I can explain the difference between text and images • I can recognise that text and images can communicate messages clearly • I can identify the advantages and disadvantages of using text and images **LO: to recognise that text and layout can be edited** • I can change font style, size, and colours for a given purpose • I can edit text • I can explain that text can be changed to communicate more clearly **LO: to choose appropriate page settings** • I can define the term 'page orientation' • I can recognise placeholders and say why they are important • I can create a template for a particular purpose **LO: to add content to a desktop publishing publication** • I can choose the best locations for my content • I can paste text and images to create a magazine cover • I can make changes to content after I've added it **LO: to consider how different layouts can suit different purposes** • I can identify different layouts	**Unit: Stop Frame Animations** **LO: to explain that animation is a sequence of drawings or photographs** • I can draw a sequence of pictures • I can create an effective flip book—style animation • I can explain how an animation/flip book works **LO: to relate animated movement with a sequence of images** • I can predict what an animation will look like • I can explain why little changes are needed for each frame • I can create an effective stop-frame animation **LO: to plan an animation** • I can break down a story into settings, characters and events • I can describe an animation that is achievable on screen • I can create a storyboard **LO: to identify the need to work consistently and carefully** • I can use onion skinning to help me make small changes between frames • I can review a sequence of frames to check my work • I can evaluate the quality of my animation **LO: to review and improve an animation** • I can explain ways to make my animation better • I can evaluate another learner's animation • I can improve my animation based on feedback **LO: to evaluate the impact of adding other media to an animation**	**Unit: Vector Graphics** **LO: to identify that drawing tools can be used to produce different outcomes** • I can recognise that vector drawings are made using shapes • I can experiment with the shape and line tools • I can discuss how vector drawings are different from paper-based drawings **LO: to create a vector drawing by combining shapes** • I can identify the shapes used to make a vector drawing • I can explain that each element added to a vector drawing is an object • I can move, resize, and rotate objects I have duplicated **LO: to use tools to achieve a desired effect** • I can use the zoom tool to help me add detail to my drawings • I can explain how alignment grids and resize handles can be used to improve consistency • I can modify objects to create a new image **LO: to recognise that vector drawings consist of layers** • I can identify that each added object creates a new layer in the drawing • I can change the order of layers in a vector drawing • I can use layering to create an image **LO: to group objects to make them easier to work with** • I can copy part of a drawing by duplicating several objects • I can recognise when I need to group and ungroup objects • I can reuse a group of objects to further develop my vector drawing	**Unit: Video Production** **LO: to explain what makes a video effective** • I can explain that video is a visual media format • I can identify features of videos • I can compare features in different videos **LO: to identify digital devices that can record video** • I can identify and find features on a digital video recording device • I can experiment with different camera angles • I can make use of a microphone **LO: to capture video using a range of techniques** • I can suggest filming techniques for a given purpose • I can capture video using a range of filming techniques • I can review how effective my video is **LO: to create a storyboard** • I can outline the scenes of my video • I can decide which filming techniques I will use • I can create and save video content **LO: to identify that video can be improved through reshooting and editing** • I can store, retrieve, and export my recording to a computer • I can explain how to improve a video by reshooting and editing • I can select the correct tools to make edits to my video **LO: to consider the impact of the choices made when making and sharing a video** • I can make edits to my video and improve the final outcome • I can recognise that my choices when making a video will impact on the quality of the final outcome • I can evaluate my video and share my opinions **Unit: Web Page Creation**

COMPUTING KNOWLEDGE AND SKILLS PROGRESSION

- I can say what tool I used to change the text
- I can decide if my changes have improved my writing
- I can use 'undo' to remove changes

LO: to compare typing on a computer to writing on paper

- I can make changes to text on a computer
- I can explain the differences between typing and writing
- I can say why I prefer typing or writing

Unit: Digital Music

LO: 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

LO: 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

LO: 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

LO: 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

LO: to create music for a purpose

- I can choose appropriate paint tools and colours to recreate the work of an artist
- I can say which tools were helpful and why

LO: 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

LO: 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

Unit: Digital Photography

LO: 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

LO: 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

- I can match a layout to a purpose
- I can choose a suitable layout for a given purpose

LO: to consider the benefits of desktop publishing

- I can identify the uses of desktop publishing in the real world
- I can say why desktop publishing might be helpful
- I can compare work made on desktop publishing to work created by hand

- I can add other media to my animation
- I can explain why I added other media to my animation
- I can evaluate my final film

Unit: Photo Editing

LO: to explain that the composition of digital images can be changed

- I can improve an image by rotating it
- I can explain why I might crop an image
- I can use photo editing software to crop an image

LO: to explain that colours can be changed in digital images

- I can explain that different colour effects make you think and feel different things
- I can experiment with different colour effects
- I can explain why I chose certain colour effects

LO: to explain how cloning can be used in photo editing

- I can add to the composition of an image by cloning
- I can identify how a photo edit can be improved
- I can remove parts of an image using cloning

LO: to explain that images can be combined

- I can experiment with tools to select and copy part of an image
- I can use a range of tools to copy between images
- I can explain why photos might be edited

LO: to combine images for a purpose

- I can describe the image I want to create
- I can choose suitable images for my project
- I can create a project that is a combination of other images

LO: to evaluate how changes can improve an image

- I can review images against a given criteria
- I can use feedback to guide making changes
- I can combine text and my image to complete the project

Unit: Audio Production

LO: to identify that sound can be recorded

- I can identify the input and output devices used to record and play sound
- I can use a computer to record audio
- I can explain that the person who records the sound can say who is allowed to use it

LO: to apply what I have learned about vector drawings

- I can create a vector drawing for a specific purpose
- I can reflect on the skills I have used and why I have used them
- I can compare vector drawings to freehand paint drawings

Unit: 3D Modelling

LO: to recognise that you can work in three dimensions on a computer

- I can add 3D shapes to a project
- I can view 3D shapes from different perspectives
- I can move 3D shapes relative to one another

LO: to identify that digital 3D objects can be modified

- I can resize an object in three dimensions
- I can lift/lower 3D objects
- I can recolour a 3D object

LO: to recognise that objects can be combined in a 3D model

- I can rotate objects in three dimensions
- I can duplicate 3D objects
- I can group 3D objects

LO: to create a 3D model for a given purpose

- I can accurately size 3D objects
- I can show that placeholders can create holes in 3D objects
- I can combine a number of 3D objects

LO: to plan my own 3D model

- I can analyse a 3D model
- I can choose objects to use in a 3D model
- I can combine objects in a design

LO: to create my own digital 3D model

- I can construct a 3D model based on a design
- I can explain how my 3D model could be improved
- I can modify my 3D model to improve it

LO: to review an existing website and consider its structure

- I can explore a website
- I can discuss the different types of media used on websites
- I know that websites are written in HTML

LO: to plan the features of a web page

- I can recognise the common features of a web page
- I can suggest media to include on my page
- I can draw a web page layout that suits my purpose

LO: to consider the ownership and use of images (copyright)

- I can say why I should use copyright-free images
- I can find copyright-free images
- I can describe what is meant by the term 'fair use'

LO: to recognise the need to preview pages

- I can add content to my own web page
- I can preview what my web page looks like
- I can evaluate what my web page looks like on different devices and suggest/make edits

LO: to outline the need for a navigation path

- I can explain what a navigation path is
- I can describe why navigation paths are useful
- I can make multiple web pages and link them using hyperlinks

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

- I can explain the implication of linking to content owned by others
- I can create hyperlinks to link to other people's work
- I can evaluate the user experience of a website

	• 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 **LO: 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	**LO: 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 **LO: 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 **LO: 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 **LO: 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		**LO: to explain that audio recordings can be edited** • I can inspect the soundwave view to know where to trim my recording • I can discuss what sounds can be added to a podcast • I can re-record my voice to improve my recording **LO: to recognise the different parts of creating a podcast project** • I can explain how sounds can be combined to make a podcast more engaging • I can save my project so the different parts remain editable • I can plan appropriate content for a podcast **LO: to combine audio to enhance my podcast project** • I can open my project to continue working on it • I can arrange multiple sounds to create the effect I want • I can explain the difference between saving a project and exporting an audio file **LO: to evaluate the effective use of audio** • I can listen to an audio recording to identify its strengths • I can suggest improvements to an audio recording I can choose appropriate edits to improve my podcast		
Programming	**Unit: Moving a Robot** **LO: 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 **LO: to act out a given word** • I can follow an instruction	**Unit: Programming Animations** **LO: to choose a command for a given purpose** • I can find which commands to move a sprite • I can use commands to move a sprite • I can compare different programming tools	**Unit: Sequencing Sounds** **LO: to explore a new programming environment** • I can identify the objects in a Scratch project (sprites, backdrops) • I can explain that objects in Scratch have attributes (linked to) • I can recognise that commands in Scratch are represented as blocks **LO: to identify that commands have an outcome**	**Unit: Repetition in Shapes** **LO: to identify that accuracy in programming is important** • I can program a computer by typing commands • I can explain the effect of changing a value of a command • I can create a code snippet for a given purpose **LO: to create a program in a text-based language**	**Unit: Selection in Quizzes** **LO: to explain how selection is used in computer programs** • I can recall how conditions are used in selection • I can identify conditions in a program • I can modify a condition in a program **LO: to relate that a conditional statement connects a condition to an outcome** • I can use selection in an infinite loop to check a condition • I can identify the condition and outcomes in an 'if... then… else...' statement	**Unit: Selection in Physical Computing** **LO: to control a simple circuit connected to a computer** • I can create a simple circuit and connect it to a microcontroller • I can program a microcontroller to make an LED switch on • I can explain what an infinite loop does **LO: to write a program that includes count-controlled loops** • I can connect more than one output component to a microcontroller • I can use a count-controlled loop to control outputs

COMPUTING KNOWLEDGE AND SKILLS PROGRESSION

- I can recall words that can be acted out
- I can give directions

LO: to combine forwards and backwards commands to make a sequence

- I can compare forwards and backwards movements
- I can start a sequence from the same place
- I can predict the outcome of a sequence involving forwards and backwards commands

LO: 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

LO: 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

LO: 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

Unit: Robot Algorithms

LO: 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 enacted as a sequence
- I can give clear instructions

LO: to explain what happens when we change the order of instructions

- I can use the same instructions to create different algorithms

LO: 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

LO: 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

LO: 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

LO: 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

LO: 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

Unit: Programming Quizzes

LO: 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 identify that each sprite is controlled by the commands I choose
- I can create a program following a design
- I can choose a word which describes an on-screen action for my plan

LO: to explain that a program has a start

- I can start a program in different ways
- I can create a sequence of connected commands
- I can explain that the objects in my project will respond exactly to the code

LO: to recognise that a sequence of commands can have an order

- I can explain what a sequence is
- I can combine sound commands
- I can order notes into a sequence

LO: to change the appearance of my project

- I can build a sequence of commands
- I can decide the actions for each sprite in a program
- I can make design choices for my artwork

LO: to create a project from a task description

- I can identify and name the objects I will need for a project
- I can relate a task description to a design
- I can implement my algorithm as code

Unit: Events and Actions in Programs

LO: to explain how a sprite moves in an existing project

- I can explain the relationship between an event and an action
- I can choose which keys to use for actions and explain my choices
- I can identify a way to improve a program

LO: to create a program to move a sprite in four directions

- I can choose a character for my project
- I can choose a suitable size for a character in a maze
- I can program movement

LO: to adapt a program to a new context

- I can use a template to create a design for my program
- I can write an algorithm to produce a given outcome
- I can test my algorithm in a text-based language

LO: to explain what 'repeat' means

- I can identify everyday tasks that include repetition as part of a sequence, eg brushing teeth, dance moves
- I can identify patterns in a sequence
- I can use a count-controlled loop to produce a given outcome

LO: to modify a count-controlled loop to produce a given outcome

- I can identify the effect of changing the number of times a task is repeated
- I can predict the outcome of a program containing a count-controlled loop
- I can choose which values to change in a loop

LO: to decompose a task into small steps

- I can identify 'chunks' of actions in the real world
- I can use a procedure in a program
- I can explain that a computer can repeatedly call a procedure

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

- I can design a program that includes count-controlled loops
- I can make use of my design to write a program
- I can develop my program by debugging it

- I can create a program with different outcomes using selection

LO: to explain how selection directs the flow of a program

- I can explain that program flow can branch according to a condition
- I can design the flow of a program which contains 'if… then… else…'
- I can show that a condition can direct program flow in one of two ways

LO: to design a program which uses selection

- I can outline a given task
- I can use a design format to outline my project
- I can identify the outcome of user input in an algorithm

LO: to create a program which uses selection

- I can implement my algorithm to create the first section of my program
- I can test my program
- I can share my program with others

LO: to evaluate my program

- I can identify ways the program could be improved
- I can identify the setup code I need in my program
- I can extend my program further

Unit: Variables in Games

LO: to define a 'variable' as something that is changeable

- I can identify examples of information that is variable
- I can explain that the way a variable changes can be defined
- I can identify that variables can hold numbers or letters

LO: to explain why a variable is used in a program

- I can identify a program variable as a placeholder in memory for a single value
- I can explain that a variable has a name and a value
- I can recognise that the value of a variable can be changed

LO: to choose how to improve a game by using variables

- I can decide where in a program to change a variable
- I can make use of an event in a program to set a variable
- I can recognise that the value of a variable can be used by a program

LO: to design a project that builds on a given example

- I can choose the artwork for my project
- I can create algorithms for my project

- I can design sequences that use count-controlled loops

LO: to explain that a loop can stop when a condition is met

- I can explain that a condition is either true or false
- I can design a conditional loop
- I can program a microcontroller to respond to an input

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

- I can explain that a condition being met can start an action
- I can identify a condition and an action in my project
- I can use selection (an 'if…then…' statement) to direct the flow of a program

LO: to design a physical project that includes selection

- I can identify a real-world example of a condition starting an action
- I can describe what my project will do
- I can create a detailed drawing of my project

LO: to create a program that controls a physical computing project

- I can write an algorithm that describes what my model will do
- I can use selection to produce an intended outcome
- I can test and debug my project

Unit: Sensing Movement

LO: to create a program to run on a controllable device

- I can apply my knowledge of programming to a new environment
- I can test my program on an emulator
- I can transfer my program to a controllable device

LO: to explain that selection can control the flow of a program

- I can identify examples of conditions in the real world
- I can use a variable in an if, then, else statement to select the flow of a program
- I can determine the flow of a program using selection

LO: to update a variable with a user input

- I can use a condition to change a variable
- I can experiment with different physical inputs
- I can explain that checking a variable doesn't change its value

LO: to use a conditional statement to compare a variable to a value

- I can use an operand (e.g. <>=) in an if, then statement
- I can explain the importance of the order of conditions in else, if statements
- I can modify a program to achieve a different outcome

LO: to design a project that uses inputs and outputs on a controllable device

	• 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 commands **LO: 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 **LO: to explain that programming projects can have code and artwork** • I can explain the choices 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 **LO: 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 **LO: 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	• I can show how to run my program **LO: 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 **LO: 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 **LO: 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 **LO: 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 **LO: 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	• I can use a programming extension • I can consider the real world when making design choices • I can choose blocks to set up my program **LO: to develop my program by adding features** • I can identify additional features (from a given set of blocks) • I can choose suitable keys to turn on additional features • I can build more sequences of commands to make my design work **LO: to identify and fix bugs in a program** • I can test a program against a given design • I can match a piece of code to an outcome • I can modify a program using a design **LO: to design and create a maze-based challenge** • I can make design choices and justify them • I can implement my design • I can evaluate my project **<u>Unit: Repetition in Games</u>** **Lesson 1 is not taught in this unit so is not included in this document.** **LO: to explain that in programming there are infinite loops and count controlled loops** • I can modify loops to produce a given outcome • I can choose when to use a count-controlled and an infinite loop • I can recognise that some programming languages enable more than one process to be run at once **LO: to develop a design that includes two or more loops which run at the same time** • I can choose which action will be repeated for each object • I can explain what the outcome of the repeated action should be • I can evaluate the effectiveness of the repeated sequences used in my program **LO: to modify an infinite loop in a given program** • I can identify which parts of a loop can be changed		• I can explain my design choices **LO: to use my design to create a project** • I can create the artwork for my project • I can choose a name that identifies the role of a variable • I can test the code that I have written **LO: to evaluate my project** • I can identify ways that my game could be improved • I can use variables to extend my game • I can share my game with others	• I can decide what variables to include in a project • I can design the algorithm for my project • I can design the program flow for my project **LO: to develop a program to use inputs and outputs on a controllable device** • I can create a program based on my design • I can test my program against my design • I can use a range of approaches to find and fix bugs

			• I can explain the effect of my changes • I can re-use existing code snippets on new sprites **LO: to design a project that includes repetition** • I can evaluate the use of repetition in a project • I can select key parts of a given project to use in my own design • I can develop my own design explaining what my project will do **LO: to create a project that includes repetition** • I can refine the algorithm in my design • I can build a program that follows my design • I can evaluate the steps I followed when building my project			
Data and Information 	**Unit: Grouping Data** **LO: 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 **LO: to identify that objects can be counted** • I can count objects • I can group objects • I can count a group of objects **LO: 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 **LO: 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 **LO: to compare groups of objects** • I can choose how to group objects • I can describe groups of objects		**Unit: Branching Databases** **LO: to create questions with yes/no answers** • I can investigate questions with yes/no answers • I can make up a yes/no question about a collection of objects • I can create two groups of objects separated by one attribute **LO: to identify the attributes needed to collect data about an object** • I can select an attribute to separate objects into groups • I can create a group of objects within an existing group • I can arrange objects into a tree structure **LO: to create a branching database** • I can select objects to arrange in a branching database • I can group objects using my own yes/no questions • I can test my branching database to see if it works **LO: to explain why it is helpful for a database to be well structured** • I can create yes/no questions using given attributes • I can compare two branching database structures • I can explain that questions need to be ordered carefully to split objects into similarly sized groups **LO: to plan the structure of a branching database**		**Unit: Flat-file Databases** **LO: to use a form to record information** • I can create a database using cards • I can explain how information can be recorded • I can order, sort, and group my data cards **LO: to compare paper and computer-based databases** • I can explain what a field and a record is in a database • I can navigate a flat-file database to compare different views of information • I can choose which field to sort data by to answer a given question **LO: to outline how you can answer questions by grouping and then sorting data** • I can explain that data can be grouped using chosen values • I can group information using a database • I can combine grouping and sorting to answer specific questions **LO: to explain that tools can be used to select specific data** • I can choose which field and value are required to answer a given question • I can outline how 'AND' and 'OR' can be used to refine data selection • I can choose multiple criteria to answer a given question **LO: to explain that computer programs can be used to compare data visually** • I can select an appropriate chart to visually compare data • I can refine a chart by selecting a particular filter • I can explain the benefits of using a computer to create charts	

- I can record how many objects are in a group

LO: 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

Unit: Pictograms

LO: 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

LO: 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

LO: 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

LO: 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

LO: to recognise that people can be described by attributes

- I can choose a suitable attribute to compare people

- I can independently create questions to use in a branching database
- I can create questions that will enable objects to be uniquely identified
- I can create a physical version of a branching database

LO: to independently create an identification tool

- I can create a branching database that reflects my plan
- I can work with a partner to test my identification tool
- I can suggest real-world uses for branching databases

Unit: Data Logging

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

- I can choose a data set to answer a given question
- I can suggest questions that can be answered using a given data set
- I can identify data that can be gathered over time

LO: to use a digital device to collect data automatically

- I can explain what data can be collected using sensors
- I can use data from a sensor to answer a given question
- I can identify that data from sensors can be recorded

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

- I can recognise that a data logger collects data at given points
- I can identify the intervals used to collect data
- I can talk about the data that I have captured

LO: to recognise how a computer can help us analyse data

- I can view data at different levels of detail
- I can sort data to find information
- I can explain that there are different ways to view data

LO: to identify the data needed to answer questions

- I can propose a question that can be answered using logged data
- I can plan how to collect data using a data logger

LO: to use a real-world database to answer questions

- I can ask questions that will need more than one field to answer
- I can refine a search in a real-world context
- I can present my findings to a group

Unit: Spreadsheets

LO: to create a data set in a spreadsheet

- I can collect data
- I can suggest how to structure my data
- I can enter data into a spreadsheet

LO: to build a data set in a spreadsheet

- I can explain what an item of data is
- I can choose an appropriate format for a cell
- I can apply an appropriate format to a cell

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

- I can explain which data types can be used in calculations
- I can construct a formula in a spreadsheet
- I can identify that changing inputs changes outputs

LO: to apply formulas to data

- I can calculate data using different operations
- I can create a formula which includes a range of cells
- I can apply a formula to multiple cells by duplicating it

LO: to create a spreadsheet to plan an event

- I can use a spreadsheet to answer questions
- I can explain why data should be organised
- I can apply a formula to calculate the data I need to answer questions

LO: to choose suitable ways to present data

- I can produce a chart
- I can use a chart to show the answer to questions
- I can suggest when to use a table or chart

	• I can collect the data I need • I can create a pictogram and draw conclusions from it **LO: 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		• I can use a data logger to collect data **LO: to use data from sensors to answer questions** • I can interpret data that has been collected using a data logger • I can draw conclusions from the data that I have collected • I can explain the benefits of using a data logger			