Freegrounds Junior School - Computing Curriculum (Teacher Computing)

Computer Science Steps

Year 3	Year 4	Year 5	Year 6		
Programming A					
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	**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	**To control a simple circuit connected to a computer** ● I can build a simple circuit to connect a microcontroller to a computer ● I can program a microcontroller to light an LED or Sparkle ● I can explain why I used an infinite loop	**To define a 'variable' as something that is changeable** ● I can identify examples of information that is variable ● I can explain that the way that a variable changes can be defined ● I can identify that variables can hold numbers or letters		**E-Safety**
To identify that commands have an outcome ● I can identify that each sprite is controlled by the commands I choose ● I can choose a word which describes an on-screen action for my plan ● I can create a program following a design to identify that commands have an outcome	**To create a program in a text-based language** ● 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	**To write a program that includes count-controlled loops** ● I can connect more than one output device to a microcontroller ● I can design sequences for given output devices ● I can decide which output devices I control with a count controlled loop	**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		**Trial**
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	**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, eg 'step 3 times' means the same as 'step, step, step' ● I can use a count-controlled loop to produce a given outcome	**To explain that a loop can stop when a condition is met, e.g. number of times** ● I can explain that a condition is something that can either be true or false (e.g. whether a value is more than 10, or whether a button has been pressed) ● I can experiment with a do until loop ● I can program a microcontroller to respond to an input	**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		
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	**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	**To conclude that a loop can be used to repeatedly check whether a condition has been met** ● I can explain 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	**To design a project that builds on a given example** ● I can choose the artwork for my project ● I can explain my design choices ● I can create algorithms for my project		
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	**To decompose a program into parts** ● 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	**To design a physical project which includes selection** ● I can identify a condition to start an action (real world) ● I can describe what my project will do (the task) ● I can create a detailed drawing of my project	**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		
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	**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	**To create a controllable system which includes selection** ● I can write an algorithm to control lights and a motor ● I can use selection to produce an intended outcome ● I can test and debug my project	**To evaluate my project** ● I can identify ways that my game could be improved ● I can extend my game further using more variables ● I can share my game with others		
Programming B					
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	**To develop the use of count-controlled loops in a different programming environment** ● I can list an everyday task as a set of instructions including repetition ● I can predict the outcome of a snippet of code ● I can modify a snippet of code to create a given outcome	**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	**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		
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	**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	**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 ● I can create a program that uses selection to produce different outcomes	**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		
To adapt a program to a new context ● 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	**To develop a design which 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	**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	**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 if you read a variable, the value remains		
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	**To modify an infinite loop in a given program** ● I can identify which parts of a loop can be changed ● I can explain the effect of my changes ● I can re-use existing code snippets on new sprites	**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	**To use an conditional statement to compare a variable to a value** ● I can explain the importance of the order of conditions in else if statements ● I can use an operand (e.g. <>=) in an if… then… statement ● I can modify a program to achieve a different outcome		
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	**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	**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	**To design a project that uses inputs and outputs on a controllable device** ● 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		
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	**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	**To evaluate my program** ● I can identify ways the program could be improved ● I can identify what setup code my project needs ● I can extend my program further	**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		

DL & IT

Year 3	Year 4	Year 5	Year 6		
Creating Media A					
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	**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	**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	**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		

Key Stage 2

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	**To explain that audio recordings can be edited** ● I can re-record my voice to improve my recording ● I can inspect the soundwave view to know where to trim my recording ● I can discuss what sounds can be added to a podcast	**To use a digital device to 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	**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		
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	**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	**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	**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'		
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	**To apply audio editing skills independently** ● I can record content following my plan ● I can review the quality of my recordings ● I can improve my voice recordings	**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	**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.		
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	**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	**To identify that video can be improved through reshooting and editing** ● I can store, retrieve, and export my recording using a digital device ● I can explain how to improve a video by reshooting and editing ● I can select the correct tools to make edits to my video	**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		
To evaluate the impact of adding other media to an animation ● 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	**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	**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	**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		
		Creating Media B			
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	**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	**To identify that drawing tools can be used to produce different outcomes** ● I can recognise that vector drawings are made using shapes ● I can identify the main drawing tools ● I can discuss how a vector drawing is different from paper-based drawings	**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		
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	**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	**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	**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		
To choose appropriate page settings ● I can explain what 'page orientation' means ● I can recognise placeholders and say why they are important ● I can create a template for a particular purpose	**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	**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 different effects	**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		
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	**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	**To recognise that vector drawings consist of layers** ● I can identify that each added object creates a new layer in the drawing ● I can identify which objects are in the front layer or in the back layer of a drawing ● I can change the order of layers in a vector drawing	**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		
To consider how different layouts can suit different purposes ● I can identify different layouts ● I can match a layout to a purpose ● I can choose a suitable layout for a given purpose	**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	**To group objects to make them easier to work with** ● I can copy part of a drawing by duplicating several objects ● I can group to create a single object ● I can reuse a group of objects to further develop my vector drawing	**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		
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	**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	**To evaluate my vector drawing** ● I create alternatives to vector drawings ● I can suggest improvements to a vector drawing ● I can apply what I have learned about vector drawings	**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		
		Data and Information			
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	**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	**To create a dataset in a spreadsheet** ● I can collect data ● I can suggest how to structure my data ● I can enter data into a spreadsheet	**To navigate between a range of cells and begin to use simple formatting** ● I can identify columns, rows, cells, and cell references ● I can identify a 'range' of cells using : ● I can use simple formatting techniques		
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	**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	**To build a dataset 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	**To use different mathematical operations in formulas** ● I can Input numerical data into a spreadsheet ● I can use basic formulas with cell references to perform calculations in a spreadsheet (+, -, *, /) ● Use the autofill tool to replicate cell data		
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	**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	**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	**To explain that data and information come in different forms and from different sources** ● I can explain the difference between data and information ● I can explain the difference between primary and secondary sources of data ● I can collect data		

	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	**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	**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	**To explain that functions enable us to analyse data in a spreadsheet** ● I can analyse data ● I can create appropriate charts in a spreadsheet ● I can use the functions SUM, COUNTA, MAX, and MIN in a spreadsheet		
	To plan the structure of a branching database ● 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	**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	**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	**To use more complex functions to filter and sort data in a spreadsheet** ● I can analyse data ● I can use a spreadsheet to sort and filter data ● I can use the functions AVERAGE, COUNTIF, and IF in a spreadsheet		
	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	**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	**To choose suitable ways to present data** ● I can produce a chart ● I can use a chart to show the answer to a question ● I can suggest when to use a table or chart	**To apply knowledge of sorting, filtering and using functions** ● I can use conditional formatting in a spreadsheet ● I can apply functions to return different values ● I can create charts or graphs from a given dataset		
		Computing Systems and Networks				
	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	**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	**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 the input, process, and output of a digital system ● I can explain that computer systems communicate with other devices	**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		
	To identify input and output devices ● I can classify input and output devices ● I can model a simple process ● I can design a digital device	**To recognise how networked devices make up the internet** ● I can describe the different networked devices and how they connect ● I can explain how the internet allows us to view the World Wide Web ● I can recognise that the World Wide Web is the part of the internet that contains websites and web pages	**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	**To recognise how data is transferred across the internet** ● I can identify and explain the main parts of a data packet ● I can explain that data is transferred over networks in packets ● I can explain that all data transferred over the internet is in packets		
	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	**To outline how websites can be shared via the World Wide Web** ● I can explain the types of media that can be shared on 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	**To identify how to use a search engine** ● 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	**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		
	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	**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	**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	**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		
	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	**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	**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	**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		
	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	**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	**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	**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		