MABLETHORPE PRIMARY ACADEMY

Progression of Skills: Computing

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Computer Science: Programming			
Unit	**Declarative Knowledge**	**Procedural Knowledge**	**Vocabulary**
KS1 Programming A – Moving A Robot **(Year A)**	• I understand that a program is a set of commands that a computer can run. • I know that a command produces an outcome. • I understand that a series of instructions can be issued before they can be enacted.	• I can predict and then run my command on a floor robot. • I can choose a series of commands that can be run as a program. • I can build a sequence of commands that can be run as a program on a device	Bee-Bot, forwards, backwards, turn, clear, go, commands, instructions, directions, left, right, route, plan, algorithm, program.
KS1 Programming B – Programming Animations **(Year B)**	• I understand that a program is a set of commands that a computer can run. • I know that a command produces an outcome. • I understand that a series of instructions can be issued before they can be enacted. • I know a list of step-by-step commands is a sequence.	• I can choose a series of commands that can be run as a program. • I can build a sequence of commands that can be run as a program on a device	ScratchJr, command, sprite, compare, programming, area, block, joining run, program, background, delete, reset, algorithm, predict,value, instructions
KS1 Programming A – Robot Algorithms **(Year A)**	• I know that a sequence is a series of instructions (commands). • I know that a program is a sequence that can be run (executed). • I understand that there is a different outcome when the order of the instructions is changed.	• I can predict and run a command on a given device. • I can list commands, giving commands for a given purpose. • I can choose a series of commands that can be run as a program, building a sequence of commands in steps.	sequence, command, program, run, start, outcome, predict, blocks, design, actions, sprite, project, modify, change, algorithm, build, match, compare, debug.



	• I know that outcomes can be predicted before running (executing) a program.	• I can run a program on a device.	
KS1 Programming B – Programming Quizzes **(Year B)**	• I know that a sequence is a series of instructions (commands). • I know that a program is a sequence that can be run (executed). • I understand that there is a different outcome when the order of the instructions is changed. • I know that outcomes can be predicted before running (executing) a program.	• I can predict and run a command on a given device. • I can list commands, giving commands for a given purpose. • I can choose a series of commands that can be run as a program, building a sequence of commands in steps. • I can run and debug a program on a device	sequence, command, program, run, predict, blocks, design, sprite, project, modify, algorithm, build, debug, evaluate, decomposition, code.
LKS2 Programming A – Sequencing Sound **(Year B)**	• I know that a program includes sequences of commands. • I understand that the order of commands can affect a program's output. • I know that different sequences can achieve different outputs, or the same output.	• I can build a sequence of commands. • I can combine and order commands in a program. • I can create a sequence of commands to produce a given outcome.	Debug, sequence, decompose, selection, repetition, variables, input, output, algorithms, programs, code, block-based coding, Scratch, sprite, staging area, code block, run, event block, control blocks
LKS2 Programming B – Event and Actions in programs **(Year A)**	• I know that different sequences can achieve different outputs, or the same output. • I understand that a program starts because of an input.	• I know that a program includes sequences of commands. • I understand that the order of commands can affect a program's output. • I know that different sequences can achieve different outputs, or the same output.	Sequence, sprite, event, action, program, pen, stage, algorithms, selection, repetition, code, debug, output



LKS2 Programming A - Repetition in Shapes **(Year B)**	• I can understand and identify 'loops' of repeated code within programs as repeating sets of instructions. • I know that looped code within programs can run for an indefinite amount of time, *or* for a specified number of times. • I know and understand when to use a looped instruction in my program and justify its use.	• I can use a count-controlled loop or an infinite (forever) loop to produce a specified output. • I can plan a program that includes loops to produce a given outcome. • I can create two or more sequences that can run at the same time.	Loops, count-controlled loops, infinite loops, repetition, algorithms, logo, input, output.
LKS2 Programming B - Repetition in Games **(Year A)**	• I understand that a loop command can be used to repeat instructions in a program. • I understand that you can program a loop to stop after a specific number of times. • I understand the importance of instructional order in a loop, and understand when to use a loop and when not to. • I know the difference between a count-controlled and Infinite (forever) loop.	• I can use an infinite (Forever) loop in a program, to produce a given outcome. • I can use a count-controlled loop (e.g. repeat x10) in a program, to produce a given outcome. • I can create two or more sequences of code in a program, that run at the same time.	Repetition, loop, infinite, count-controlled, sequence, algorithm, sprite, debug.
UKS2 Programming A – Selection in Physical Computing **(Year B)**	• I understand that a conditional statement can either be true or false. • I know the difference between a count-controlled loop and a condition-controlled loop • I understand that selection can be used to branch the flow of a program.	• I can create a condition-controlled loop. • I can use a condition in an 'if…then…(else)' statement to start an action (produce an outcome)	Crumble controller, algorithm, sequence, selection (if…then…statements), repetition, loop, count-controlled or infinite loop, conditional statement, LED, sparkle, debug.



	• I understand that a forever (infinite) loop can be used to repeatedly check whether a condition has been met.		
UKS2 Programming B – Selection in Quizzes **(Year A)**	• I understand that a conditional statement can either be true or false. • I know the difference between a count-controlled loop and a condition-controlled loop • I understand that selection can be used to branch the flow of a program • I understand that a forever (infinite) loop can be used to repeatedly check whether a condition has been met.	• I can choose and condition and create a condition-controlled loop. • I can use a condition in an 'if…then…(else)' statement to start an action (produce an outcome)	Algorithm, sequence, repetition, selection, loop, condition, count- controlled loop, condition-controlled loop.
UKS2 Programming A – Variables in Games **(Year B)**	• I know that a variable is something that can be used and changed in a program. • I can identify examples of variables and recognise that variable scan be numbers or letters. • I know that variables have specific names and its value can be used by programs to change outcomes. • I can recognise a variable can hold only one value at any one time and you cannot access the previous value. • I can recognise a variable can be set as constant (have a fixed value)	• I can identify variables in existing programs and experiment with changing them. • I can decide where in a program to set a variable and use an event or input to update it. • I can use a variable in a conditional statement to control the flow of a program. • I can use the same variable in more than one location in. program.	variable, change, name, value, set, event, declare



	• I can explain that the name of a variable needs to be unique and is meaningless to a computer		
UKS2 Programming B – Sensing Movement **(Year A)**	• I know that a variable is something that can be used and changed in a program. • I can identify examples of variables and recognise that variable scan be numbers or letters. • I know that variables have specific names and its value can be used by programs to change outcomes. • I can recognise a variable can hold only one value at any one time and you cannot access the previous value. • I can recognise a variable can be set as constant (have a fixed value) • I can explain that the name of a variable needs to be unique and is meaningless to a computer	• I can identify variables in existing programs and experiment with changing them. • I can decide where in a program to set a variable and use an event or input to update it. • I can use a variable in a conditional statement to control the flow of a program. • I can use the same variable in more than one location in. program.	micro:bit, MakeCode, input, process, output, flashing, USB, trace, selection, condition, if then else, variable, random, sensing, accelerometer, value, compass, direction, navigation, algorithm, step counter, test, debug.



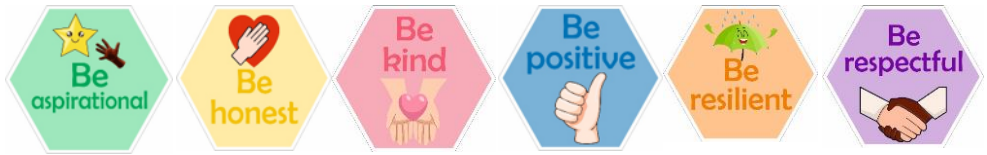
Computer Science: Computing Systems and Networks			
Unit	**Declarative Knowledge**	**Procedural Knowledge**	**Vocabulary**
KS1 – Technology around us (Year A&B)	• I know how technology helps us. • I know that a computer is an example of technology. • I understand that choices are made with technology, and this is why rules are important.	• I can choose a piece of technology to do a job, recognising that technology can be used in different ways. • I can identify and use parts (including a mouse and keyboard) of a computer. • I can show how to use technology safely and responsibly.	technology, computer, mouse, trackpad, keyboard, screen, double-click, typing.
KS1 – Information Technology around Us (Year A&B)	• I know the different types of computers used in school. • I know that a computer is part of Information Technology. • I understand the term Information Technology and know different forms of IT. • I know the uses and rules of different forms of IT. • I know the benefits of using IT	• I can describe uses of IT • I can identify IT in school and beyond. • I can show others how to use IT safely and responsibly	Information technology (IT), computer, barcode, scanner/scan
LKS2 – Connecting Computers (Year A&B)	• I understand the terms 'input and output' linked to computers and how they are linked to the process. • I understand how devices in a network are connected to one another. • I understand how information is passed through multiple connections on a network. • I know the benefits of computer networks.	• I can identify input and output devices and explain the processes they do. • I can identify network devices around me and how they connect to one another. • I can explain how switches, servers and wireless access points can be used in a network to share information.	Network, data, server, wireless access points (WAPs), network switch, router, input, process, output, Wi-Fi, Bluetooth.



LKS2 – The Internet (Year A&B)	• I understand how networks connect and communicate with each other and that together, the global interconnection of networks make up the Internet. • I know that the World Wide Web (WWW) is a collection of websites and web pages, and that the Internet enables us to view these. • I understand that WWW content can be created by anyone and shared with everyone. • I understand the limitations, reliability and benefit of the World Wide Web and its content.	• I can describe what the Internet is, and how devices physically connect. • I can explain what the World Wide Web is, and the difference between it and the Internet. • I can explain the different types of content that can be created for the WWW and evaluate its reliability, the usefulness of content created, and the consequences of unreliable content	Network, data, World Wide Web, Internet, web page, website, content, media, copywrite.
UKS2 - Systems and Searching **(Year A)**	• I understand that a computer system is a collection of inputs, processes and outputs, and how they play a role in our lives. • I understand that there are a number of search engines (a type of system) and I know how search results are found, ordered and 'ranked.' • I understand why the order of results is important, and to whom, and understand some of the limitations of search engines.	• I can compare different search engines and explain why search results might be different, when searching for the same thing. • I can evaluate the results of search terms and identify that results from search engines can include adverts, and that the adverts can be targeted at specific audiences.	Address bar, search box, World Wide Web, search engine, web crawler, page rank, ranking, communication, search terms.
UKS2 - Communication and Collaboration	• I understand that computers have protocols and rules to follow, so that information can be shared over the internet, using 'packets' of information.	• I can identify different ways to communicate using technology and evaluate different methods of online communication effectively.	communication, protocol, data, address, Internet Protocol (IP), Domain Name Server (DNS), packet, header, data



(Year B)	• I can understand the benefits of computer systems in our lives and how they enable collaborative projects. • I can define 'communication' and discuss the opportunities that technology offers for communication.	• I can identify what you should and should not share online.	payload, chat, explore, slide deck, reuse, remix, collaboration, internet, public, private, one-way, two-way, one-to-one, one-to-many.



Information Technology: Data and Information			
Unit	**Declarative Knowledge**	**Procedural Knowledge**	**Vocabulary**
KS1 – Pictograms **(Year B)**	• I know a tally chart is used to collect data • I know that data can be grouped by their attributes and then compared. • I know that tally charts and pictograms need headings which relate to the data. • I know that information can be presented in different ways using a computer. • I understand why some data (or information when in context) should not be shared.	• I can enter and view data on a computer. • I recognise that people, animals and objects can be described by attributes. • I can use a computer to answer single-attribute and comparison questions.	more than, less than, most, least, common, popular, organise, data, object, tally chart, votes, total, pictogram, enter, data, compare, objects, count, explain, attribute, group, same, different, conclusion, block diagram, sharing
LKS2 – Branching databases **(Year A)**	• I understand that a branching database is an identification tool and know how it works. • I know attributes can be identified by asking yes/no questions. • I know that a well-structured branching database will enable you to identify objects using fewer questions. • I know real-world applications for branching databases.	• I can create questions with yes/no answers. • I can choose questions that will divide objects into evenly-sized smaller groups. • I can identify an object using a branching database and retrieve information from different levels of the database.	Branching database, Attribute / property, Yes/no questions, data, information.
LKS2 – Data loggers **(Year B)**	• I know that sensors can be used to gather data to answer a specific question. • I understand what type of data to collect in order to answer a specific question.	• I know and can explain where to place a sensor to collect specific data to answer a question. • I can identify a time frame and appropriate sensor to use, in order to capture data to answer a specific question.	Sensor, data, information, data logger, time-frame, input, output



	• I know that a data logger captures data from specific points in time, using an appropriate environmental sensor.	• I can collect, analyse, evaluate and present data, in order to answer a specific question.	
UKS2 – Spreadsheets **(Year A)**	• I can explain what data is, and that it needs a context. • I know a range of the different types of software tools that deal with and organise data. • I know that formulas can be used to produce calculated dataI know why data should be organised in a spreadsheet • I know that cells can be linked and understand that a cell's value automatically updates when the value in a linked cell is changed.	• I can give examples of data types and contexts in which they may be used. • I can identify and use data handling software and input, present and evaluate data. • I can apply formulas to data and functions to create new data. • I can explain how my data presentation represents the answer to a specific question.	data, collecting, table, structure, spreadsheet, cell, cell reference, data item, format, formula, calculation, spreadsheet, input, output, operation, range, duplicate, sigma, propose, question, data set, organised, chart, evaluate, results, sum, comparison, software, tools.



Information Technology: Creating Media			
Unit	**Declarative Knowledge**	**Procedural Knowledge**	**Vocabulary**
KS1 - Digital Painting **(Year A)**	• I know that computer can be used to create art. • I know what the different freehand tools do on the chosen application. • I understand how to adjust a tool to suit my needs, deciding on the appropriate tool for use and considering the impact of my choices. • I understand the differences between painting on a computer to using brushes.	• I can create a picture using freehand tools, shape and line. • I can use a range of paint colours and use the fill tool when needed. • I can use the undo button to correct a mistake.	paint program, tool, paintbrush, erase, fill, undo, shape tools, line tool, fill tool, undo tool, colour, brush style, brush size
KS1 - Digital Writing **(Year A)**	• I understand that a keyboard enters text and changes the output of a key. • I know that text can be edited and changed. • I can consider the impact of choices made.	• I can use a keyboard to enter or remove text, including letters, numbers or special characters. • I can select and change the position of text in a document. • I can choose options to achieve a desired effect including changing the appearance of text.	word processor, keyboard, keys, type, space, backspace, text cursor, toolbar, bold, italic, underline, mouse, select, font, undo, redo, format, compare, typing
KS1 - Digital Photography **(Year B)**	• I know that some digital devices can capture images using a camera. • I know how to take and save/store a photograph for future viewing. • I know the features of a good photograph and how one could be improved. • I understand how light can affect a photograph.	• I can capture a digital image, in either landscape or portrait mode. • I can use the zoom on the camera to change the composition of the photos and consider the use of light before taking my photo. • I can use filters to edit the appearance of the photo.	quiet, loud, pattern, rhythm, pulse, pitch, tempo, rhythm, notes, beat, instrument, open, edit.



	• I know that some photos are not accurate.		
LKS2 - Stop Frame Animation **(Year A)**	• I know that an animation is made up of a sequence of images. • I know that different apps/software can be used to create animation. • I understand that devices used to create animations must be in a fixed position. • I know that smaller movements in image placements creates smoother animations. • I understand the term 'onion skinning' and how this can help to produce successful animations. • I understand the term 'export' and know how animations can be exported to be viewed.	• I can plan, record and edit an animation. • I can use a range of tools such as onion skinning, reviewing and deleting scenes to improve an animation. • I can add further media to enhance an animation such as titles, background music and effects.	animation, flip book, stop frame, frame, image, onion skinning, media, import, transition.
LKS2 - Desktop Publishing **(Year B)**	• I understand how text and images can be structured, using placeholders, to convey information. • I know how different document layouts can suit different purposes. • I understand the benefits and reasons why I might use a DTP application.	• I can add, delete, resize and rotate images to and from placeholders in a document. • I can add, edit and change text, applying appropriate fonts, sizing and styles to suit the purpose of the document. • I can reorientate a page, organising placeholders to suit the purpose, and review my document, making changes where necessary.	Layout, landscape, portrait, placeholders, font, style, edit, right click, left click, group/ungroup.
UKS2 - Introduction to Vector graphics	• I understand what a vector drawing is, and that different tools can be used to modify them.	• I can describe a vector drawing and create it as a 2D drawing on a screen. • I can group and layer objects on a screen and evaluate the impact of my choices.	Vector drawing, layer, group, modify, 2D object.



(Year B)	• I know that objects can be layered and grouped, or sent backwards / forwards and how to do this. • I know that vector images can be modified in a variety of ways, without impacting on quality, and can demonstrate this.	• I can use a variety of modifying tools to change a vector drawing, by selecting, rotating, dragging, repositioning, adding, recolouring, resizing and grouping objects.	
UKS2 - Video Production **(Year A)**	• I know the key concepts of video composition. • I understand why I need to plan and create a video storyboard, capture video according to my plan, and edit my finished product. • I know the options of improvements to my video, and understand the effect of editing choices made.	• I can use a video recording device to carry out the following functions: recording, panning, focussing, zooming and editing specific recording effects (e.g. filters). • I can locate, playback and transfer/export video I have recorded. • I can edit video using the following functions, justifying my choices: selecting specific sections, applying effects, deleting sections, splitting sections, cropping sections of video.	Storyboard, panning, zooming, editing, filters, cropping, exporting.
UKS2 - 3D Modelling **(Year B)**	• I can recognise that a 3D environment can be viewed from different perspectives. • I can show how placeholders can create holes in 3D objects. • I can recognise that artefacts can be broken down into a collection of 3D objects.	• I can position 3D shapes and use digital tools to modify 3D objects. • I can use digital tools to accurately size 3D objects and combine them to create a 3D digital artefact. • I can construct a 3D model which reflects a real world object.	TinkerCAD, 2D, 3D, shapes, select, move, perspective, view, handles, resize, lift, lower, recolour, rotate, duplicate, group, placeholder, hollow, construct

