Computing Progression Year group by Year Group

Year 1: Computing systems and networks – technology around us. Information technology	
Declarative knowledge	**Procedural knowledge**
To explain that technology is something that can help us.	To choose a piece of technology to do a job
To identify examples of technology.	To recognise that some technology can be used in different ways
To explain how examples of technology help us.	To identify the main parts of a computer
To recognise that a computer is an example of technology	To use a mouse in different ways
To recognise that choices are made when using technology	To use a keyboard to type
To explain why rules are needed when using technology.	To use the keyboard to edit text.

Year 1: Creating media- digital painting. Digital literacy	
Declarative knowledge	**Procedural knowledge**
To explain what different freehand tools do	To create a picture using freehand tools
To recognise computers can be used to create art	To use shape and line tools when precision is needed
To recognise a tool can be adjusted to suit my need	To use a range of paint colours
To decide when it's appropriate to use each tool	To use the fill tool to colour an enclosed area
To consider impact of choices made	To use the undo button to correct a mistake
To compare painting using a computer with painting using brushes.	To combine a range of tools to create a piece of artwork.

Year 1: Programming A: Moving a robot. Computer Science	
Declarative knowledge	**Procedural knowledge**
To recall words that can be enacted	To enact a given word
To explain what a given command does	To predict the outcome of a command on a device
To match a command to an outcome	To list which commands can be used on a given device
To understand that a program is a set of commands that a computer can run	To run a command on a floor robot
To recall that a series of instructions can be issued before they are enacted.	To choose a command for a given purpose
	To choose a series of words that can be enacted as a program
	To choose a series of commands that can be run as a program
	To build a sequence of commands in steps
	To combine commands in a program
	To run a program on a device.

Computing Progression Year group by Year Group

Year 1: Data and information. Grouping data. Information technology	
Declarative knowledge	**Procedural knowledge**
To identify that objects can be counted	To identify some attributes of an object
To recognise that information can be presented	To collect simple data
To recognise that information can be presented in different ways.	To show that collected data can be counted
	To describe the properties of an object
	To choose an attribute to group objects by
	To group objects to answer questions
	To explain that objects can be grouped by similarities (attribute)
	To describe a group of objects (based on commonality).

Year 1: Creating media: digital writing. Digital literacy	
Declarative knowledge	**Procedural knowledge**
To recognise that a keyboard is used to enter text into a computer	To use letter, number, and Space keys to enter text into a computer
To recognise that the Shift key changes the output of a key	To use punctuation and special characters
To recognise that text can be changed	To select text
To recognise that text can be edited	To change the appearance of text on a computer
To recognise that the appearance of text can be changed	To choose options to achieve a desired effect
To consider the impact of choices made.	To position the text cursor in a chosen location
	To use the Backspace key to remove text
	To use Undo.

Year 1: Programming B- Programming algorithms. Computer Science	
Declarative knowledge	**Procedural knowledge**
To enact a given word	To choose a series of words that can be enacted as a program
To recall words that can be enacted	To choose a series of commands that can be run as a program
To predict the outcome of a command on a device	To run a program on a device.
To list that commands can be used on a given device	
To explain what a given command does	
To match a command to an outcome	

Computing Progression Year group by Year Group

To recognise how to run a command (press a button)	
To choose a command for a given purpose	
To understand that a program is a set of commands a computer can run	
To recall that a series of instructions can be issued before they are enacted	
To build a sequence of commands in steps	
To combine commands in a program.	

Year 2: Computing systems and networks- IT around us. Information technology	
Declarative knowledge	**Procedural knowledge**
To recognise different types of computers used in school	To describe some uses of computers
To identify that a computer is a part of information technology	To identify information technology in school
To recognise the features of information technology	To identify information technology beyond school
To talk about uses of information technology	To show how to use information technology safely
To say how rules for using information technology can help us	
To explain how information technology benefits us	
To recognise that choices are made when using information technology.	

Year 2: Creating Media- Digital photography. Digital literacy	
Declarative knowledge	**Procedural knowledge**
To recognise that some digital devices can capture images using a camera	To capture a digital image
To talk about how to take a photograph	To take photographs in both landscape and portrait format
To recognise that photographs can be saved and viewed later	To view photographs on a digital device
To make choices when composing my photograph	To decide which photographs to keep
To recognise features of 'good' photographs	To hold the camera still to take a clear photograph
To identify how a photograph could be improved	To use zoom to change the composition of a photograph
To explain the effect of light on a photograph	To consider lighting before taking a photograph
To recognise that photographs can be change after they have been taken	To improve a photograph by retaking it
To recognise that some images are not accurate	To use filters to edit the appearance of a photograph.

Year 2: Programming A: Robot algorithms Computer Science	
Declarative knowledge	**Procedural knowledge**

Computing Progression Year group by Year Group

To describe that a series of instructions is a sequence	To choose a series of words that can be enacted as a sequence
To recall that a series of instructions can be issued before they are enacted	To choose a series of instructions that can be run as a program
To explain what happens when we change the order of instructions	To create a program
To recognise that you can predict the outcome of a program	To trace a sequence to make a prediction
	To run a program on a device
	To debug a program that I have written

Year 2: Data and information- Pictograms Information technology	
Declarative knowledge	**Procedural knowledge**
To use a tally chart to collect data	To recognise that people, animals and objects can be described by attributes
To compare objects that have been grouped by attribute	To show I can enter data onto a computer
To construct (complete) a given comparison question	To use a computer to view data in different formats
To suggest appropriate headings for tally charts and pictograms	To use pictograms to answer single-attribute questions
To explain that we can present information using a computer	To use a computer to answer comparison questions (graphs, tables)
To use a computer program to present information in different ways	
To give simple examples of why some information should not be shared.	

Year 2: Creating media- Digital music Digital literacy	
Declarative knowledge	**Procedural knowledge**
To identify that computers can be used to play sounds of different instruments	To experiment with different sounds on a computer
To identify that the same pattern can be represented in different ways	To experiment with musical patterns on a computer
To compare playing music on instruments with making music on a computer	To use a computer to create a musical pattern
	To use a computer to compose a rhythm and a melody on a given theme
	To use a computer to play the same music in different ways (e.g. tempo)
	To evaluate a musical composition created on a computer
	To improve a musical composition created on a computer

Year 2: Programming B- Programming quizzes Computer Science	
Declarative knowledge	**Procedural knowledge**
To describe a series of instructions as a ‘sequence’	To choose a series of words that can be enacted as a sequence

Computing Progression Year group by Year Group

To recall that a series of instructions can be issued before they are enacted	To explain what happens when we change the order of instructions
To use logical reasoning to predict the outcome of a program	To choose a series of commands that can be run as a program
	To trace a sequence to make a prediction
	To test a prediction by running the sequence
	To create and debug a program that I have written
	To run a program on a device.

Year 3: Computer Systems and Networks: Connecting Computers Information technology	
Declarative knowledge	**Procedural knowledge**
To describe what an input is	To identify input and output devices
To explain that a process acts on the inputs	To explain that a computer system accepts an input and processes it to produce an output
To explain that an output is produced by the process	To explain how a computer network can be used to share information
To identify how changing the process can affect the output	To explain the role of a switch, server, and wireless access point in a network
To explain how computer systems can change the way that we work	To identify network devices around me
To recognise that a digital device is made up of several parts	To explain how networks can be connected to other networks.
To recognise that computers can be connected to each other	
To identify how devices in a network are connected with one another	
To recognise that a network is made up of a number of components	
To explain how information is passed through multiple connections	
To identify the benefits of computer networks.	

Year 3: Creating media: Stop frame animation. Digital literacy	
Declarative knowledge	**Procedural knowledge**
To explain that an animation is made up of a sequence of images	To set up the work area with an awareness if what will be captured
To identify that a capturing device needs to be in a fixed position	To plan an animation using a storyboard
To recognise that smaller movements create smoother animations	To capture an image
To explain the need for consistency in working	To use the onion skinning tool to review subject position
To explain the impact of adding other media to an animation	To move a subject between captures
To explain that a project must be exported so it can be shared.	To review a captured sequence of frames as an animation
	To remove frames to improve an animation

	To add media to enhance an animation
	To review a completed project

Year 3: Programming A- Sequencing Sounds. Computer Science	
Declarative knowledge	**Procedural knowledge**
To explain that programs start because of an input	To build a sequence of commands
To explain what a sequence is	To combine commands in a program
To identify that a program includes sequences of commands	To order commands in a program
To identify that the sequence of a program is a process	To create a sequence of commands to produce a given outcome
To explain that the order of commands can affect a program's output	
To identify that different sequences can achieve the same output	
To identify that different sequences can achieve different outputs	

Year 3: Data and information- Branching databases. Information technology	
Declarative knowledge	**Procedural knowledge**
To investigate questions with yes/no answers	To create questions with yes/no answers
To identify attributes that you can ask yes/no questions about	To choose questions that will divide objects into evenly sized subgroups
To select an attribute to separate objects into two similarly sized groups	To repeatedly create subgroups of objects
To explain that a branching database is an identification tool	To identify an object using a branching database
To recognise that a data set can be structured using yes/no questions	To retrieve information from different levels of the branching database.
To explain that a well-structured branching database will enable you to identify objects using fewer questions	
To relate two levels of a branching database using AND	
To suggest real-world applications for branching databases	

Year 3: Creating Media- Desktop publishing Digital literacy	
Declarative knowledge	**Procedural knowledge**
To recognise how text and images can be used together to convey information	To show that page orientation can be changed
To define landscape and portrait as two different page orientations	To add text to a placeholder
To consider how different layouts can suit different purposes	To organise text and image placeholders in a page layout

Computing Progression Year group by Year Group

To recognise that DTP pages can be structured with placeholders	To add and remove images to and from placeholders
To recognise how different font styles and effects are used for particular purposes	To move resize and rotate images
To consider the benefits of using a DTP application.	To edit text in a placeholder
	To choose fonts and apply effects to text
	To review a document.

Year 3: Programming B- Events and actions. Computer Science	
Declarative knowledge	**Procedural knowledge**
To explain that programs start because of an input	To build a sequence of commands
To explain what a sequence is	To combine commands in a program
To identify that a program includes sequences of commands	To order commands in a program
To identify that the sequence of a program is a process	To create a sequence of commands to produce a given outcome.
To explain that the order of commands can affect a program's output	
To identify that different sequences can achieve the same output	
To identify that different sequences can achieve different outputs	

Year 4: Computing Systems and Networks: The internet Information technology	
Declarative knowledge	**Procedural knowledge**
To describe how networks connect to other networks	
To outline how information can be shared via the World Wide Web	
To recognise that the World Wide Web is part of the internet	
To explain that the global interconnection of networks is the internet	
To recognise the need for security on the internet	
To describe how to access the World Wide Web	
To describe the types of content/media that can be added, created, and shared on the World Wide Web	
To explain how the content of the World Wide Web is created, owned, and shared by people	
To explain that the internet enables us to view the World Wide Web	
To explain that the World Wide Web comprises of websites and web pages	
To describe the current limitations of World Wide Web media	

To evaluate the reliability of content and the consequences of unreliable content	
To explain the benefits of the World Wide Web.	

Year 4: Creating Media- Audio Production Digital literacy	
Declarative knowledge	**Procedural knowledge**
To identify that sound can be recorded	To record sound using a computer
To identify that an input device is needed to record sound	To play recorded audio
To identify that output devices are needed to play audio	To import audio into a project
To recognise that recorded audio can be stored on a computer	To delete a section of audio
To recognise that audio can be edited	To change the volume of tracks in a project
To recognise that sound can be represented visually as a waveform	
To recognise that audio can be layered so that multiple sounds can be played at the same time	
To consider the results of editing choices made	

Year 4: Programming A- repetition in shapes. Computer Science	
Declarative knowledge	**Procedural knowledge**
To relate what 'repeat' means	To list an everyday task as a set of instructions including repetition.
To identify everyday tasks that include repetition as part of a sequence, eg brushing teeth, dance moves	To use an indefinite loop to produce a given outcome
To explain that we can use a loop command in a program to repeat instructions	To use a count-controlled loop to produce a given outcome
To identify patterns in a sequence	To plan a program that includes appropriate loops to produce a given outcome
To identify a loop within a program	To recognise tools that enable more than one process to be run at the same time (concurrency)
To explain that in programming there are indefinite loops and count-controlled loops	To create two or more sequences that run at the same time.
To explain that an indefinite loop will run until the program is stopped	
To explain that you can program a loop to stop after a specific number of times	
To identify patterns in a sequence, eg 'step 3 times' means the same as 'step, step, step'	

To justify when to use a loop and when not to	
To explain the importance of instruction order in a loop	
To recognise that not all tools enable more than one process to be run at once.	

Year 4: Data and information- Data logging. Information technology	
Declarative knowledge	**Procedural knowledge**
To suggest questions that can be answered using a table of data	To use a digital device to collect data automatically
To identify data that can be logged over time	To choose how often to automatically collect data samples
To identify that sensors are input devices	To use a set of logged data to find information
To recognise that a sensor can be used as an input device for data collection	To use a computer program to sort data by one attribute
To explain that a data logger captures 'data points' from sensors over time.	To export information in different formats.

Year 4: Creating Media- photo editing Digital literacy	
Declarative knowledge	**Procedural knowledge**
To use an application to change the whole of a digital image	To recognise that digital images can be manipulated
To use an application to change part of a digital image	To recognise that digital images can be changed for different purposes
To use an application to add to the composition of a digital imag	To choose the most appropriate tool for a particular purpose
To change the composition of a digital image by rotating and flipping	To consider the impact of changes made on the quality of the image
To change the composition of a digital image by cropping	
To adjust colours of a digital image	
To apply filters to a digital image	
To apply effects to a digital image	
To select part of a digital image	
To use clone, copy, and paste to change the composition of a digital image	
To use cloning to retouch a digital image	
To add text to a digital image	

Year 4: Programming B- Repetition in games. Computer Science	
Declarative knowledge	**Procedural knowledge**

Computing Progression Year group by Year Group

To relate what 'repeat' means	To list an everyday task as a set of instructions including repetition
To identify everyday tasks that include repetition as part of a sequence, eg brushing teeth, dance moves	To use an indefinite loop to produce a given outcome
To explain that we can use a loop command in a program to repeat instructions	To use a count-controlled loop to produce a given outcome
To identify patterns in a sequence	To plan a program that includes appropriate loops to produce a given outcome
To identify a loop within a program	To recognise tools that enable more than one process to be run at the same time (concurrency)
To explain that in programming there are indefinite loops and count-controlled loops	To create two or more sequences that run at the same time.
To explain that an indefinite loop will run until the program is stopped	
To explain that you can program a loop to stop after a specific number of times	
To identify patterns in a sequence, eg 'step 3 times' means the same as 'step, step, step'	
To justify when to use a loop and when not to	
To explain the importance of instruction order in a loop	
To recognise that not all tools enable more than one process to be run at once.	

Year 5: Computer Systems and Networks: Systems and searching Information technology	
Declarative knowledge	**Procedural knowledge**
To recognise that a system is a set of interconnected parts which work together	To describe the input and output of a search engine
To explain that computers can be connected together to form IT systems	To demonstrate that different search terms produce different results
To identify that data can be transferred between IT systems	To evaluate the results of search terms.
To recognise inputs, processes, and outputs in large IT systems	
To describe the role of a particular IT system in their lives	
To relate that search engines are examples of large IT systems	
To explain why search engines create indices, and that they are different for each search engine	
To explain the role of web crawlers in creating an index	
To explain how search results are selected	
To explain that ranking orders search results to make them more useful	

To explain how ranking is determined by rules, and that different search engines use different rules	
To explain why the order of results is important and to whom	
To explain how search engines make money by selling targeted advertising space	
To identify some of the limitations of search engines.	

Year 5: Creating Media: Video Production Digital literacy	
Declarative knowledge	**Procedural knowledge**
To explain the features of video as a visual media format	To use different camera angles
To recognise which devices can and can't record video	To use pan, tilt and zoom
To explain the purpose of a storyboard	To combine filming techniques for a given purpose
To recognise that filming techniques can be used to create different effects	To identify features of a video recording device or application
To recognise the need to regularly review and reflect on a video project	To determine what scenes will convey your idea
To identify videos can be improved through and reshooting or editing	To choose to reshoot a scene or improve later through editing
To identify that videos can be edited on a recording device or on a computer	To decide what changes I will make when editing
To explain the limitations of editing video on a recording device	To use split, trim and crop to edit a video
To recognise projects need to be exported to be shared	

Year 5: Programming A- Selection in Physical Computing Computer Science	
Declarative knowledge	**Procedural knowledge**
To explain that a condition can only be true or false	To create a condition-controlled loop
To relate that a count-controlled loop contains a condition	To use a condition in an 'if...then…' statement to start an action
To compare a count-controlled loop with a condition-controlled loop	To use selection to switch the program flow in one of two ways
To explain that a condition-controlled loop will stop when a condition is met	To use a condition in an 'if...then...else…' statement to produce given outcomes.
To explain that when a condition is met, a loop will complete a cycle before it stops	
To explain that selection can be used to branch the flow of a program	
To explain that a loop can be used to repeatedly check whether a condition has been met	
To explain the importance of instruction order in 'if...then...else...' statements.	

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Year 5: Data and Information- Flat file databases Information technology	
Declarative knowledge	**Procedural knowledge**
To explain that a computer program can be used to organise data	To choose different ways to view data
To explain that tools can be used to select data to answer questions	To choose which attribute and value to search by to answer a given question (operands)
To outline how ordering data allows us to answer some questions	To ask questions that need more than one attribute to answer
To outline how operands can be used to filter data	To choose which attribute to sort data by to answer a given question
To outline how 'AND' and 'OR' can be used to refine data selection	To choose multiple criteria to search data to answer a given question (AND and OR)
To explain that computer programs can be used to compare data visually	To select an appropriate graph to visually compare data
To explain that we present information to communicate a message.	To choose suitable ways to present information to other people.

Year 5: Creating Media- introduction to Vector graphics. Digital literacy	
Declarative knowledge	**Procedural knowledge**
To identify that a vector drawing comprises separate objects	To add an object to a vector drawing
To recognise that each object in a drawing is in its own layer	To select one object or multiple objects
To recognise that vector images can be scaled without impact on quality	To delete objects
To recognise that objects can be modified in groups	To move objects between the layers of a drawing
To explain how alignment and size guides can help create a more consistent drawing	To duplicate objects using copy and paste
To consider the impact of choices made.	To modify objects
	To reposition objects
	To group and ungroup selected objects
	To combine options to achieve a desired effect
	To create a vector drawing for a given purpose.

Year 5: Programming B- Selection in quizzes Computer Science	
Declarative knowledge	**Procedural knowledge**
To explain that a condition can only be true or false	To choose a condition to use in a program
To relate that a count-controlled loop contains a condition	To create a condition-controlled loop
To compare a count controlled loop with a condition-controlled loop	To use a condition in an 'if... then…' statement to start an action

To explain that a condition-controlled loop will stop when a condition is met	To use selection to switch program flow
To explain that when a condition is met a loop will complete a cycle before it stops	To use 'if... then... else…' to switch program flow in one of two ways.
To explain that selection can be used to branch the flow of a program	
To explain that a loop can be used to repeatedly check whether a condition has been met	
To explain the importance of instruction order in 'if... then... else...' statements	

Year 6: Computing Systems and Networks Information technology	
Declarative knowledge	**Procedural knowledge**
To recognise that data is transferred across networks using agreed protocols (methods)	To outline methods of communicating and collaborating using the internet
To recognise that connections between computers allow access to shared stored files	To choose methods of internet communication and collaboration for given purposes
To explain that data is transferred in packets	To evaluate different methods of online communication and collaboration
To recognise computers connected to the internet allow people in different places to work together	To decide what you should and should not share online
To discuss the opportunities that technology offers for communication and collaboration	
To explain which types of media can be shared through the internet	
To explain that communicating and collaboration using the internet can be public or private.	

Year 6: Creating Media- Web Page Creation Digital literacy	
Declarative knowledge	**Procedural knowledge**
To recognise the relationship between HTML and visual display	To review an existing website (navigation bars, header)
To recognise that web pages can contain different media types	To create a new blank web page
To recognise that web pages are written by people	To add text to a web page
To recognise that a website is a set of hyperlinked web pages	To set the style of text on a web page
To recognise components of a web page layout	To change the appearance of text
To consider the ownership and use of images (copyright)	To embed media in a web page
To recognise the need to preview pages (different screens / devices)	To add web pages to a website

To recognise the need for a navigation path	To preview a web page (different screen sizes)
To recognise the implications of linking to content owned by others	To insert hyperlinks between pages
	To insert hyperlinks to another site.

Year 6: Variables in games Computer Science	
Declarative knowledge	**Procedural knowledge**
To define a 'variable' as something that is changeable.	To identify a variable in an existing program
To identify examples of information that is variable, for example, a football score during a match	To experiment with the value of an existing variable
To explain that a variable can be used in a program, eg 'score'	To choose a name that identifies the role of a variable to make it easier for humans to understand it
To define a program variable as a placeholder in memory for a single value	To decide where in a program to set a variable
To explain that a variable has a name and a value	To update a variable with a user input
To recognise that the value of a variable can be used by a program	To use an event in a program to update a variable
To recognise that the value of a variable can be updated	To use a variable in a conditional statement to control the flow of a program
To identify that variables can hold numbers (integers) or letters (strings)	To use the same variable in more than one location in a program
To define the way that a variable is changed	
To recognise that a variable can be set as a constant (fixed value)	
To explain the importance of setting up a variable at the start of a program (initialisation)	
To explain that there is only one value for a variable at any one time	
To explain that if you change the value of a variable, you cannot access the previous value (cannot undo)	
To explain that if you read a variable, the value remains	
To explain that the name of a variable is meaningless to the computer	
To explain that the name of a variable needs to be unique.	

Year 6: Date and information- introduction to Spreadsheets Information technology	
Declarative knowledge	**Procedural knowledge**
To identify questions that can be answered using spreadsheet data	To calculate data using a formula for each operation
To explain what an item of data is in a spreadsheet	To use functions to create new data
To explain how the data type determines how a spreadsheet can process the data	To use existing cells within a formula

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To outline that there are different software tools to work with data	To choose suitable ways to present spreadsheet data
To explain that formulas can be used to produce calculated data	
To recognise cells can be linked	
To explain why data should be organised in a spreadsheet	
To recognise that a cell's value automatically updates when the value in a linked cell is changed	
To evaluate results in comparison to the question asked	

Year 6: 3d modelling Digital literacy	
Declarative knowledge	**Procedural knowledge**
To explain that 3D models can be created on a computer	To position 3D shapes relative to one another
To recognise that a 3D environment can be viewed from different perspectives	To use digital tools to modify 3D objects
To recognise that digital tools can be used to manipulate 3D objects	To combine objects to create a 3D digital artefact
To show how placeholders can create holes in 3D objects	To use digital tools to accurately size 3D objects
To recognise that artefacts can be broken down into a collection of 3D objects	To construct a 3D model which reflects a real-world object

Year 6: Programming B- Sensing movement Computer Science	
Declarative knowledge	**Procedural knowledge**
To define 'variable' as something that is changeable	To identify a variable in an existing program
To identify examples of information that is variable, e.g. a football score during a match	To experiment with the value of an existing variable
To explain that a variable can be used in a program, e.g. 'score'	To choose a name that identifies the role of a variable to make it more usable (to humans)
To define a program variable as a placeholder in memory for a single value	To decide where in a program to set a variable
To explain that a variable has a name and a value	To update a variable with a user input
To recognise that the value of a variable can be used by a program	To use an event in a program to update a variable
To recognise that the value of a variable can be updated	To use a variable in a conditional statement to control the flow of a program
To define the way that a variable is changed	To use the same variable in more than one location in a program
To recognise that a variable can be set as a constant (fixed value)	
To explain the importance of setting up a variable at the start of a program (initialisation)	

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