Programming A

Computer Science Steps

From NCCE Learning Graphs (Teach Computing)

Year 1	Year 2	Year 3	Year 4	Year 5
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	**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 and unambiguous instructions	**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 ● I can explain why I used an infinite loop
To act out a given word ● I can follow an instruction ● I can recall words that can be acted out ● I can give directions	**To explain what happens when we change the order of instructions** ● I can create different algorithms for a range of sequences (using the same commands) ● 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	**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 design ● I can create a program following a design	**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 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	**To use logical reasoning to predict the outcome of a program (series of commands)** ● I can follow a sequence ● I can predict the outcome of a sequence ● I can compare my prediction to the program outcome	**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 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	**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	**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 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	**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	**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 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	**To create and debug a program that I have written** ● I can plan algorithms for different parts of a task ● I can test and debug each part of the program ● I can put together the different parts of my program	**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
Year 1	Year 2	Year 3	Year 4	Year 5

Programming B

To choose a command for a given purpose
- I can find which commands move a sprite
- I can use commands to move a sprite
- I can compare different programming tools

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 show how to run my program

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

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

To identify the effect of changing a value
- I can find blocks which have numbers
- I can change the value
- I can say what happens when I change a value

To create a program using a given design
- I can tell 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

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

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

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

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

To use my algorithm to create a program
- I can use sprites which match my design
- I can add programming blocks based on my algorithm
- I can test the programs I have created

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

DL & IT Steps (lots of crossover - especially in year 4 - sometimes into CS too)

Year 1 **Year 2**

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 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 with different outcomes 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 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 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 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

Year 3 **Year 4** **Year 5**

Creating Media

Year 1	Year 2	Year 3	Year 4	Year 5
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	**To say how music can make us feel** ● I can identify simple differences in pieces of music ● I can listen with concentration to a range of music (links to the Music curriculum) ● I can describe how music makes me feel, e.g. happy or sad	**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 digital images can be changed** ● I can identify changes that we can make to an image ● I can explore how images can be changed in real life ● I can explain the effect that editing can have on 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 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	**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	**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 change the composition of an image** ● I can explain what has changed in an edited image ● I can change the composition of an image by selecting parts of it ● I can consider why someone might want to change the composition of an image	**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 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	**To describe how music can be used in different ways** ● I can connect images with sounds ● I can use a computer to experiment with pitch and duration ● I can relate an idea to a piece of music	**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	**To describe how images can be changed for different uses** ● I can talk about changes made to images ● I can choose effects to make my image fit a scenario ● I can explain why my choices fit a scenario	**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 explain why I chose the tools I used ● I know that different paint tools do different jobs ● I can choose appropriate paint tools and colours to recreate the work of an artist ● I can say which tools were helpful and why	**To show how music is made from a series of notes** ● I can identify that music is a sequence of notes ● I can use a computer to create a musical pattern using three notes ● I can refine my musical pattern on a computer	**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 make good choices when selecting different tools** ● I can identify how an image has been retouched ● I can give examples of positive and negative effects that retouching can have on an image ● I can choose appropriate tools to retouch an image	**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 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	**To create music for a purpose** ● I can describe an animal using sounds ● I can explain my choices ● I can save my work	**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 recognise that not all images are real** ● I can sort images into 'fake' or 'real' and explain my choices ● I can combine parts of images to create new images ● I can talk about fake images around me	**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 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	**To review and refine our computer work** ● I can reopen my work ● I can explain how I made my work better ● I can listen to music and describe how it makes me feel	**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 consider the effect of adding other elements to my work ● I can compare the original image with my completed publication ● I can evaluate the impact of my publication on others through feedback	**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

Creating Media

Year 1	Year 2	Year 3	Year 4	Year 5
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	**To know what devices can be used to take photographs** ● I can sort devices into old and new ● I can talk about how to take a photograph ● I can capture digital photos and talk about my experience	**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 digitally recorded:** ● I can identify digital devices that can record sound and play it back ● I can identify the inputs and outputs required to play audio or record sound ● I can recognise the range of sounds that can be recorded	**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 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	**To use a digital device to take 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	**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 use a digital device to record sound:** ● I can use a device to record audio and play back sound ● I can suggest how to improve my recording ● I can discuss what other people include when recording sound for 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 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	**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	**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 explain that a digital recording is stored as a file:** ● I can plan and write the content for a podcast ● I can discuss why it is useful to be able to save digital recordings ● I can save a digital recording as a file	**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 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	**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 focus on an object	**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 explain that audio can be changed through editing:** ● I can open a digital recording from a file ● I can discuss ways in which audio recordings can be altered ● I can edit sections of of an audio recording	**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 explain why I used the tools that I chose ● 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	**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	**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 show that different types of audio can be combined and played together:** ● I can discuss sounds that other people combine ● I can choose suitable sounds to include in a podcast ● I can use editing tools to arrange sections of audio	**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
To compare writing on a computer with writing on paper ● I can write a message on a computer and on paper ● I can compare using a computer with using a pencil and paper ● I can say which method I like best	**To recognise that images can be changed** ● I can apply a range of photography skills to capture a photo ● I can recognise which images have been changed ● I can identify which images are real and which have been changed	**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 editing choices made:** ● I can explain that digital recordings need to be exported to share them ● I can discuss the features of a digital recording I like ● I can suggest improvements to a digital recording	**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

Computer Systems and Networks

Year 1	Year 2	Year 3	Year 4	Year 5
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	**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 information technology	**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 that a computer system features inputs, processes, and outputs ● I can explain that computer systems communicate with other devices
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	**To identify information technology in the home** ● I can explain the purpose of information technology in the home ● I can open a file ● I can move and resize images	**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 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	**To identify information technology beyond school** ● I can find examples of information technology ● I can talk about uses of information technology ● I can compare types of information technology	**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 use a keyboard to type ● I can tell you that writing on a computer is called typing ● I can type my name on a computer ● I can use the shift key to type a capital letter ● I can save my work to a file	**To explain how information technology benefits us** ● I can demonstrate how information technology is used in a shop ● I can recognise that information technology can be connected ● I can explain how information technology helps people	**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** ● I can create media which can be found on websites ● I can recognise that I can add content to the WWW ● I can explain that new content can be created 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 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	**To show how to use information technology safely** ● I can list different uses of information technology ● I can recognise how to use information technology responsibly ● I can say how those rules/guides can help me	**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 create rules for using technology responsibly ● I can identify rules to keep us safe and healthy when we are using technology in and beyond the home ● I can give examples of some of these rules ● I can discuss how we benefit from these rules	**To recognise that choices are made when using information technology** ● I can identify the choices that I make when using information technology ● I can explain simple guidance for using information technology in different environments and settings ● I can enjoy a variety of activities	**To recognise the physical components of a network** ● I can identify how devices in a network are connected with one another ● 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

Data and Information

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

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

To identify that objects can be counted
- I can count objects
- I can group objects
- I can count a group of objects

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

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

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

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

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

To compare groups of objects
- I can choose how to group objects
- I can describe groups of objects
- I can record how many objects are in a group

To recognise that people can be described by attributes
- I can choose a suitable attribute to compare people
- I can collect the data I need
- I can create a pictogram and draw conclusions from it

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

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

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 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

To use a form to record information
- I can create multiple questions about the same field
- I can explain how information can be recorded
- I can order, sort, and group my data cards

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 prove my branching database works

To use a digital device to collect data automatically
- I can explain that sensors are input devices
- I can use data from a sensor to answer a given question
- I can identify that data from sensors can be recorded

To compare paper and computer-based databases
- I can navigate a flat-file database to compare different views of information
- I can explain what a 'field' and a 'record' is in a database
- I can choose which field to sort data by to answer a given question

To explain why it is helpful for a database to be well structured
- I can create yes/no questions using given attributes
- I can explain that questions need to be ordered carefully to split objects into similarly sized groups
- I can compare two branching database structures

To explain that a data logger collects 'data points' from sensors over time
- I can identify a suitable place to collect data
- I can identify the intervals used to collect data
- I can talk about the data that I have captured

To outline how you can answer questions by grouping and then sorting data
- I can explain how information can be grouped
- I can group information to answer questions
- I can combine grouping and sorting to answer more specific questions

To identify objects using a branching database
- I can select a theme and choose a variety of objects
- I can create questions and apply them to a tree structure
- I can use my branching database to answer questions

To use data collected over a long duration to find information
- I can import a data set
- I can use a computer to view data in different ways
- I can use a computer program to sort data

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 identify the object attributes needed to collect relevant data
- 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 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
- I can use a data logger to collect data

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 graphs

To compare the information shown in a pictogram with a branching database
- I can explain what a pictogram tells me
- I can explain what a branching database tells me
- I can compare two ways of presenting information

To use collected data 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

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

Year 6

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

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

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 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 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 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

Year 6

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 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 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 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 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 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

Year 6

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 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 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 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 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 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

Year 6

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

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 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 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 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 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

Year 6

To identify how to use a search engine
● I can complete a web search to find specific information
● I can refine my search
● I can compare results from different search engines

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 explain how search results are ranked
● I can explain that search results are ordered
● I can explain that a search engine follows rules to rank relevant pages
● I can suggest some of the criteria that a search engine checks to decide on the order of results

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 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 of communicating over the internet
● I can choose methods of communication to suit particular purposes

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
● I can explain that communication on the internet may not be private

Year 6

To identify questions which can be answered using data

- I can explain the relevance of data headings
- I can answer questions from an existing data set
- I can ask simple relevant questions which can be answered using data

To explain that objects can be described using data

- I can explain what an item of data is
- I can apply an appropriate number format to a cell
- I can build a data set in a spreadsheet application

To explain that formula can be used to produce calculated data

- I can explain the relevance of a cell's data type
- I can construct a formula in a spreadsheet
- I can identify that changing inputs changes outputs

To apply formulas to data, including duplicating

- I can recognise that data can be calculated 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 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 choose suitable ways to present data

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