# Computing

Within school, the Teach Computing Curriculum (ncce.io/tcc) is used to support the teaching of the computing curriculum. The curriculum is a comprehensive collection of materials produced to support 500 hours of teaching, facilitating the delivery of the entire English computing curriculum from key stage 1 to 4 (5- to 16-year-olds). The materials are suitable for all pupils irrespective of their skills, background, and additional needs. The aims of the Teach Computing Curriculum are as follows:

- *Reduce teacher workload*
- *Show the breadth and depth of the computing curriculum, particularly beyond programming!*
- *Demonstrate how computing can be taught well, based on research*
- *Highlight areas for subject knowledge and pedagogy enhancement through training*

Online safety is taught through some elements of the Teach Computing curriculum, but also through the PSHEE using Education for a Connected World document.

**Blossom tree Nursery**

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| **Computer Science:** |
| Algorithms, problem solving and programming |
| • Begin to sequence instructions. |
| **Computer Science:** |
| Logical Reasoning |
| • Describe what they think a program will do. |
| **Information Technology:** |
| Digital Productivity Creating Content |
| • Use digital technology to access content with some support. |
| **Digital Literacy:** |
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| • Identify some ways technology is used at home and in school. |

**Nursery**

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|---|
| **Computer Science:** |
| Algorithms, problem solving and programming |
| • Begin to sequence instructions. |
| • Recognise, use and understand directional language. |
| **Computer Science:** |
| Logical Reasoning |
| • Describe what they think a program will do. |
| **Information Technology:** |
| Digital Productivity Creating Content |
| • Use digital technology to access content with some support. |
| **Digital Literacy:** |
| • Identify some ways technology is used at home and in school. |

**Reception**

| Computer Science: |
| --- |
| Algorithms, problem solving and programming |
| <ul><li>Identify algorithms used in everyday life</li><li>Begin to sequence instructions.</li><li>Recognise, use and understand directional language.</li><li>Perform a simple program on the floor robot. Recognise that a string of instructions or commands placed together can create a simple program. Record the program used using symbols.</li></ul> |
| **Computer Science:** |
| Logical Reasoning |
| <ul><li>Describe what they think a program will do.</li></ul> |
| **Information Technology:** |
| Digital Productivity Creating Content |
| <ul><li>Use digital technology to access content with some support.</li><li>Create content using digital technology.</li><li>Begin to use a mouse to navigate around a computer screen.</li></ul> |
| **Digital Literacy:** |

**Self Image and Identify**
- I can recognise, online or offline, that anyone can say 'no' / 'please stop' / 'I'll tell' / 'I'll ask' to somebody who makes them feel sad, uncomfortable, embarrassed or upset.

**Online Relationships**
- I can give examples of how I (might) use technology to communicate with people I know.
- I can recognise some ways in which the internet can be used to communicate.

**Online Reputation**
- I can identify ways that I can put information on the internet.

**Online Bullying**
- I can describe ways that some people can be unkind online.
- I can offer examples of how this can make others feel.

**Managing online information**
- I can talk about how to use the internet as a way of finding information online.
- I can identify devices I could use to access information on the internet.

**Health, Wellbeing and Lifestyle**
- I can identify rules that help keep us safe and healthy in and beyond the home when using technology.

**Privacy and Security**
- I can identify some simple examples of my personal information (e.g. name, address, birthday, age, location).
- I can describe who would be trustworthy to share this information with; I can explain why they are trusted.

**Copyright and Ownership**
- I know that work I create belongs to me.
- I can name my work so that others know it belongs to me.

## Computer Systems and Networks: Technology around us

- I can explain how these technology examples help us
- I can explain technology as something that helps us
- I can locate examples of technology in the classroom
- 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
- I can click and drag to make objects on a screen
- I can use a mouse to create a picture
- I can use a mouse to open a program
- I can save my work to a file
- I can say what a keyboard is for
- I can type my name on a computer
- I can delete letters
- I can open my work from a file
- I can use the arrow keys to move the cursor
- I can discuss how we benefit from these rules
- I can give examples of some of these rules
- I can identify rules to keep us safe and healthy when we are using technology in and beyond the home

## Creating Media: Digital painting

- I can draw lines on a screen and explain which tools I used
- I can make marks on a screen and explain which tools I used
- I can use the paint tools to draw a picture
- 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
- I can choose appropriate shapes
- I can create a picture in the style of an artist
- I can make appropriate colour choices
- I can choose appropriate paint tools and colours to recreate the work of an artist
- I can say which tools were helpful and why
- I know that different paint tools do different jobs
- I can change the colour and brush sizes
- I can make dots of colour on the page
- I can use dots of colour to create a picture in the style of an artist on my own
- I can explain that pictures can be made in lots of different ways
- I can say whether I prefer painting using a computer or using paper
- I can spot the differences between painting on a computer and on paper

## Programming A: Moving a robot

- I can match a command to an outcome
- I can predict the outcome of a command on a device
- I can run a command on a device
- I can follow an instruction
- I can give directions
- I can recall words that can be acted out
- I can compare forwards and backwards movements
- I can predict the outcome of a sequence involving forwards and backwards commands
- I can start a sequence from the same place
- 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

- I can choose the order of commands in a sequence
- I can debug my program
- I can explain what my program should do
- I can identify several possible solutions
- I can plan two programs
- I can use two different programs to get to the same place

## Data and Information: Data and information

- I can describe objects using labels
- I can identify the label for a group of objects
- I can match objects to groups
- I can count a group of objects
- I can count objects
- I can group objects
- I can describe an object
- I can describe a property of an object
- I can find objects with similar properties
- I can count how many objects share a property
- I can group objects in more than one way
- I can group similar objects
- I can choose how to group objects
- I can describe groups of objects
- I can record how many objects are in a group
- I can compare groups of objects
- I can decide how to group objects to answer a question
- I can record and share what I have found

## Creating Media: Digital writing

- I can draw lines on a screen and explain which tools I used
- I can make marks on a screen and explain which tools I used
- I can use the paint tools to draw a picture
- 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
- I can choose appropriate shapes
- I can create a picture in the style of an artist
- I can make appropriate colour choices
- I can choose appropriate paint tools and colours to recreate the work of an artist
- I can say which tools were helpful and why
- I know that different paint tools do different jobs
- I can change the colour and brush sizes
- I can make dots of colour on the page
- I can use dots of colour to create a picture in the style of an artist on my own
- I can explain that pictures can be made in lots of different ways
- I can say whether I prefer painting using a computer or using paper
- I can spot the differences between painting on a computer and on paper

## Programming B programming animations

- I can compare different programming tools
- I can find which commands to move a sprite
- I can use commands to move a sprite
- I can run my program
- I can use a Start block in a program
- I can use more than one block by joining them together
- I can change the value
- I can find blocks that have numbers

- I can say what happens when I change a value
- I can add blocks to each of my sprites
- I can delete a sprite
- I can show that a project can include more than one sprite
- I can choose appropriate artwork for my project
- I can create an algorithm for each sprite
- I can decide how each sprite will move
- I can add programming blocks based on my algorithm
- I can test the programs I have created
- I can use sprites that match my design

## Digital Literacy

**Self Image and Identify**
- I can recognise that there may be people online who could make someone feel sad, embarrassed or upset.
- If something happens that makes me feel sad, worried, uncomfortable or frightened I can give examples of when and how to speak to an adult I can trust and how they can help.

**Online Relationships**
- I can give examples of when I should ask permission to do something online and explain why this is important.
- I can use the internet with adult support to communicate with people I know (e.g. video call apps or services).

**Online Reputation**
- I can recognise that information can stay online and could be copied.
- I can describe what information I should not put online without asking a trusted adult first.

**Online Bullying**
- I can describe how to behave online in ways that do not upset others and can give examples.

**Managing online information**
- I can give simple examples of how to find information using digital technologies, e.g. **search engines**, **voice activated searching**).
- I know / understand that we can encounter a range of things online including things we like and don't like as well as things which are real or make believe / a joke.
- I know how to get help from a **trusted adult** if we see content that makes us feel sad, uncomfortable worried or frightened.

**Y2**

## Computing Systems and Networks: Information technology around us

- I can describe some uses of computers
- I can identify examples of computers
- I can identify that a computer is a part of IT
- I can identify examples of IT
- I can identify that some IT can be used in more than one way
- I can sort school IT by what it's used for
- I can find examples of information technology
- I can sort IT by where it is found
- I can talk about uses of information technology
- I can demonstrate how IT devices work together
- I can recognise common types of technology
- I can say why we use IT
- I can list different uses of information technology
- I can say how rules can help keep me safe
- I can talk about different rules for using IT
- I can explain the need to use IT in different ways

- I can identify the choices that I make when using IT
- I can use IT for different types of activities

## Creating Media: Digital photography

- I can explain what I did to capture a digital photo
- I can recognise what devices can be used to take photographs
- I can talk about how to take a photograph
- I can explain the process of taking a good photograph
- I can explain why a photo looks better in portrait or landscape format
- I can take photos in both landscape and portrait format
- I can discuss how to take a good photograph
- I can identify what is wrong with a photograph
- I can improve a photograph by retaking it
- I can experiment with different light sources
- I can explain why a picture may be unclear
- I can explore the effect that light has on a photo
- I can explain my choices
- I can recognise that images can be changed
- I can use a tool to achieve a desired effect
- I can apply a range of photography skills to capture a photo
- I can identify which photos are real and which have been changed
- I can recognise which photos have been changed

## Programming A: Robot algorithms

- I can choose a series of words that can be enacted as a sequence
- I can follow instructions given by someone else
- I can give clear and unambiguous instructions
- I can create different algorithms for a range of sequences (using the same commands)
- I can show the difference in outcomes between two sequences that consist of the same commands
- I can use an algorithm to program a sequence on a floor robot
- I can compare my prediction to the program outcome
- I can follow a sequence
- I can predict the outcome of a sequence
- 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
- I can create an algorithm to meet my goal
- I can explain what my algorithm should achieve
- I can use my algorithm to create a program
- I can plan algorithms for different parts of a task
- I can put together the different parts of my program
- I can test and debug each part of the program

## Data and Information: Pictograms

- I can compare totals in a tally chart
- I can record data in a tally chart
- I can represent a tally count as a total
- 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
- I can explain what the pictogram shows
- I can organise data in a tally chart
- I can use a tally chart to create a pictogram
- I can answer 'more than'/'less than' and 'most/least' questions about an attribute
- I can create a pictogram to arrange objects by an attribute
- I can tally objects using a common attribute
- 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
- I can give simple examples of why information should not be shared
- I can share what I have found out using a computer
- I can use a computer program to present information in different ways

## Creating Media: Making music

- I can describe how music makes me feel, e.g. happy or sad
- 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 create a rhythm pattern
- I can explain that music is created and played by humans
- I can play an instrument following a rhythm pattern
- I can identify that music is a sequence of notes
- I can refine my musical pattern on a computer
- I can use a computer to create a musical pattern using three note"
- I can identify that music is a sequence of notes
- I can refine my musical pattern on a computer
- I can use a computer to create a musical pattern using three notes
- I can describe an animal using sounds
- I can explain my choices
- I can save my work
- I can explain how I made my work better
- I can listen to music and describe how it makes me feel
- I can reopen my work

## Programming B: Programming quizzes

- I can compare different programming tools
- I can find which commands to move a sprite
- I can use commands to move a sprite
- I can run my program
- I can use a Start block in a program
- I can use more than one block by joining them together
- I can change the value
- I can find blocks that have numbers
- I can say what happens when I change a value
- I can add blocks to each of my sprites
- I can delete a sprite
- I can show that a project can include more than one sprite

- I can choose appropriate artwork for my project
- I can create an algorithm for each sprite
- I can decide how each sprite will move
- I can add programming blocks based on my algorithm
- I can test the programs I have created
- I can use sprites that match my design

## Digital Literacy

### Online Relationships
- I can give examples of how someone might use technology to communicate with others they don't also know offline and explain why this might be risky. (e.g. email, online gaming, a pen-pal in another school / country).
- I can explain who I should ask before sharing things about myself or others online.
- I can describe different ways to ask for, give, or deny my permission online and can identify who can help me if I am not sure.
- I can explain why I have a right to say 'no' or 'I will have to ask someone'. I can explain who can help me if I feel under pressure to agree to something I am unsure about or don't want to do.
- I can identify who can help me if something happens online without my consent.
- I can explain how it may make others feel if I do not ask their permission or ignore their answers before sharing something about them online.
- I can explain why I should always ask a trusted adult before clicking 'yes', 'agree' or 'accept' online

### Online Reputation
- I can explain how information put online about someone can last for a long time.
- I can describe how anyone's online information could be seen by others.
- I know who to talk to if something has been put online without consent or if it is incorrect

### Online Bullying
- I can explain what bullying is, how people may bully others and how bullying can make someone feel.
- I can explain why anyone who experiences bullying is not to blame.
- I can talk about how anyone experiencing bullying can get help.

### Managing online information
- I can use simple keywords in **search engines**.
- I can demonstrate how to navigate a simple webpage to get to information I need (e.g. home, forward, back buttons; links, tabs and sections).
- I can explain what **voice activated searching** is and how it might be used, and know it is not a real person (e.g. Alexa, Google Now, Siri).
- I can explain the difference between things that are imaginary, 'made up' or 'make believe' and things that are 'true' or 'real'.
- I can explain why some information I find online may not be real or true.

**Key stage 1 End Points**

Pupils should be taught to:

- understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- create and debug simple programs
- use logical reasoning to predict the behaviour of simple programs
- use technology purposefully to create, organise, store, manipulate and retrieve digital content
- recognise common uses of information technology beyond school

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| • use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies. |

**Y3**

| **Computing Systems and Networks:**<br>**Connecting computer** |
|---|
| • I can explain that digital devices accept inputs<br>• I can explain that digital devices produce outputs<br>• I can follow a process<br>• I can classify input and output devices<br>• I can describe a simple process<br>• I can design a digital device<br>• I can explain how I use digital devices for different activities<br>• I can recognise similarities between using digital devices and non-digital tools<br>• I can suggest differences between using digital devices and non-digital tools<br>• I can discuss why we need a network switch<br>• I can explain how messages are passed through multiple connections<br>• I can recognise different connections<br>• I can demonstrate how information can be passed between devices<br>• I can explain the role of a switch, server, and wireless access point in a network<br>• I can recognise that a computer network is made up of a number of devices<br>• I can identify how devices in a network are connected together<br>• I can identify networked devices around me<br>• I can identify the benefits of computer networks |
| **Creating Media:**<br>**Stop frame animation** |
| • I can create an effective flip book—style animation<br>• I can draw a sequence of pictures<br>• I can explain how an animation/flip book works<br>• I can create an effective stop-frame animation<br>• I can explain why little changes are needed for each frame<br>• I can predict what an animation will look like<br>• I can break down a story into settings, characters and events<br>• I can create a storyboard<br>• I can describe an animation that is achievable on screen<br>• I can evaluate the quality of my animation<br>• I can review a sequence of frames to check my work<br>• I can use onion skinning to help me make small changes between frames<br>• I can evaluate another learner's animation<br>• I can explain ways to make my animation better<br>• I can improve my animation based on feedback<br>• I can add other media to my animation<br>• I can evaluate my final film<br>• I can explain why I added other media to my animation |
| **Programming A:**<br>**Sequencing sounds** |

- I can match a command to an outcome
- I can predict the outcome of a command on a device
- I can run a command on a device
- I can follow an instruction
- I can give directions
- I can recall words that can be acted out
- I can compare forwards and backwards movements
- I can predict the outcome of a sequence involving forwards and backwards commands
- I can start a sequence from the same place
- 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
- I can choose the order of commands in a sequence
- I can debug my program
- I can explain what my program should do
- I can identify several possible solutions
- I can plan two programs
- I can use two different programs to get to the same place

## Data and Information:
## Branching databases

- I can create two groups of objects separated by one attribute
- I can investigate questions with yes/no answers
- I can make up a yes/no question about a collection of objects
- I can arrange objects into a tree structure
- I can create a group of objects within an existing group
- I can select an attribute to separate objects into groups
- I can group objects using my own yes/no questions
- I can prove my branching database works
- I can select objects to arrange in a branching database
- I can compare two branching database structures
- 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 create questions and apply them to a tree structure
- I can select a theme and choose a variety of objects
- I can use my branching database to answer questions
- I can compare two ways of presenting information
- I can explain what a branching database tells me
- I can explain what a pictogram tells me

## Creating Media:
## Desktop publishing

- I can explain the difference between text and images
- I can identify the advantages and disadvantages of using text and images
- I can recognise that text and images can communicate messages clearly
- 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
- I can create a template for a particular purpose

- I can define the term 'page orientation'
- I can recognise placeholders and say why they are important
- I can choose the best locations for my content
- I can make changes to content after I've added it
- I can paste text and images to create a magazine cover
- I can choose a suitable layout for a given purpose
- I can identify different layouts
- I can match a layout to a purpose
- I can compare work made on desktop publishing to work created by hand
- I can identify the uses of desktop publishing in the real world
- I can say why desktop publishing might be helpful

## Programming B:
## Events and actions in programs

- I can choose which keys to use for actions and explain my choices
- I can explain the relationship between an event and an action
- I can identify a way to improve a program
- I can choose a character for my project
- I can choose a suitable size for a character in a maze
- I can program movement
- I can choose blocks to set up my program
- I can consider the real world when making design choices
- I can use a programming extension
- I can build more sequences of commands to make my design work
- I can choose suitable keys to turn on additional features
- I can identify additional features (from a given set of blocks)
- I can match a piece of code to an outcome
- I can modify a program using a design
- I can test a program against a given design
- I can evaluate my project
- I can implement my design
- I can make design choices and justify them

## Digital Literacy

### Self Image and Identify
- I can explain what is meant by the term 'identity'.
- I can explain how people can represent themselves in different ways online.
- I can explain ways in which someone might change their identity depending on what they are doing online (e.g. gaming; using an **avatar**; social media) and why.

### Online Relationships
- I can describe ways people who have similar likes and interests can get together online.
- I can explain what it means to 'know someone' online and why this might be different from knowing someone offline.
- I can explain what is meant by 'trusting someone online', why this is different from 'liking someone online', and why it is important to be careful about who to trust online including what information and content they are trusted with.
- I can explain why someone may change their mind about trusting anyone with something if they feel nervous, uncomfortable or worried.
- I can explain how someone's feelings can be hurt by what is said or written online.
- I can explain the importance of giving and gaining permission before sharing things online; how the principles of sharing online is the same as sharing offline e.g. sharing images and videos

### Online Reputation

- I can explain how to search for information about others online.
- I can give examples of what anyone may or may not be willing to share about themselves online. I can explain the need to be careful before sharing anything personal.
- I can explain who someone can ask if they are unsure about putting something online.

**Online Bullying**
- I can describe appropriate ways to behave towards other people online and why this is important.
- I can give examples of how bullying behaviour could appear online and how someone can get support.

**Health, Wellbeing and Lifestyle**
- I can explain why spending too much time using technology can sometimes have a negative impact on anyone, e.g. mood, sleep, body, relationships; I can give some examples of both positive and negative activities where it is easy to spend a lot of time engaged (e.g. doing homework, games, films, videos).
- I can explain why some online activities have age restrictions, why it is important to follow them and know who I can talk to if others pressure me to watch or do something online that makes me feel uncomfortable (e.g. age restricted gaming or web sites).

**Privacy and Security**
- I can describe simple strategies for creating and keeping passwords private.
- I can give reasons why someone should only share information with people they choose to and can trust. I can explain that if they are not sure or feel pressured then they should tell a trusted adult.
- I can describe how connected devices can collect and share anyone's information with others.

**Y4**

| Computing Systems and Networks: |
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| **The internet** |
| - I can demonstrate how information is shared across the internet |
| - I can describe the internet as a network of networks |
| - I can discuss why a network needs protecting |
| - I can describe networked devices and how they connect |
| - I can explain that the internet is used to provide many services |
| - I can recognise that the World Wide Web contains websites and web pages |
| - I can describe how to access websites on the WWW |
| - I can describe where websites are stored when uploaded to the WWW |
| - I can explain the types of media that can be shared on the WWW |
| - I can explain that internet services can be used to create content online |
| - I can explain what media can be found on websites |
| - I can recognise that I can add content to the WWW |
| - I can explain that there are rules to protect content |
| - 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 not everything on the World Wide Web is true |
| - I can explain why I need to think carefully before I share or reshare content |
| - I can explain why some information I find online may not be honest, accurate, or legal |

| Creating Media: |
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| **Audio editing** |
| - 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 |
| - I can discuss what other people include when recording sound for a podcast |
| - I can suggest how to improve my recording |

- I can use a device to record audio and play back sound
- I can discuss why it is useful to be able to save digital recordings
- I can plan and write the content for a podcast
- I can save a digital recording as a file
- I can discuss ways in which audio recordings can be altered
- I can edit sections of an audio recording
- I can open a digital recording from a file
- I can choose suitable sounds to include in a podcast
- I can discuss sounds that other people combine
- I can use editing tools to arrange sections of audio
- I can discuss the features of a digital recording I like
- I can explain that digital recordings need to be exported to share them
- I can suggest improvements to a digital recording

## Programming A:
## Repetition in shapes

- I can create a code snippet for a given purpose
- I can explain the effect of changing a value of a command
- I can program a computer by typing commands
- I can test my algorithm 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 identify everyday tasks that include repetition as part of a sequence, eg brushing teeth, dance moves
- I can identify patterns in a sequence
- I can use a count-controlled loop to produce a given outcome
- I can choose which values to change in a loop
- 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 explain that a computer can repeatedly call a procedure
- I can identify 'chunks' of actions in the real world
- I can use a procedure in a program
- I can design a program that includes count-controlled loops
- I can develop my program by debugging it
- I can make use of my design to write a program

## Data and Information:
## Data logging

- I can choose a data set to answer a given question
- I can identify data that can be gathered over time
- I can suggest questions that can be answered using a given data set
- I can explain that sensors are input devices
- I can identify that data from sensors can be recorded
- I can use data from a sensor to answer a given question
- 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
- I can import a data set
- I can use a computer program to sort data
- I can use a computer to view data in different ways

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| • I can plan how to collect data using a data logger |
| • I can propose a question that can be answered using logged data |
| • I can use a data logger to collect data |
| • I can draw conclusions from the data that I have collected |
| • I can explain the benefits of using a data logger |
| • I can interpret data that has been collected using a data logger |

**Creating Media:**
**Photo editing**

- I can explain the effect that editing can have on an image
- I can explore how images can be changed in real life
- I can identify changes that we can make to an 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
- I can explain what has changed in an edited image
- I can choose effects to make my image fit a scenario
- I can explain why my choices fit a scenario
- I can talk about changes made to images
- I can choose appropriate tools to retouch an image
- I can give examples of positive and negative effects that retouching can have on an image
- I can identify how an image has been retouched
- I can combine parts of images to create new images
- I can sort images into 'fake' or 'real' and explain my choices
- I can talk about fake images around me
- I can compare the original image with my completed publication
- I can consider the effect of adding other elements to my work
- I can evaluate the impact of my publication on others through feedback

**Programming B**
**Repetition in games**

- I can list an everyday task as a set of instructions including repetition
- I can modify a snippet of code to create a given outcome
- I can predict the outcome of a snippet of code
- I can choose when to use a count-controlled and an infinite loop
- I can modify loops to produce a given outcome
- I can recognise that some programming languages enable more than one process to be run at once
- I can choose which action will be repeated for each object
- I can evaluate the effectiveness of the repeated sequences used in my program
- I can explain what the outcome of the repeated action should be
- I can explain the effect of my changes
- I can identify which parts of a loop can be changed
- I can re-use existing code snippets on new sprites
- I can develop my own design explaining what my project will do
- 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 build a program that follows my design
- I can evaluate the steps I followed when building my project
- I can refine the algorithm in my design

Digital Literacy
**Online Relationships**

- I can describe strategies for safe and fun experiences in a range of online social environments (e.g. **livestreaming**, gaming platforms).
- I can give examples of how to be respectful to others online and describe how to recognise healthy and unhealthy online behaviours.
- I can explain how content shared online may feel unimportant to one person but may be important to other people's thoughts feelings and beliefs.

**Online Reputation**
- I can describe how to find out information about others by searching online.
- I can explain ways that some of the information about anyone online could have been created, copied or shared by others.

**Online Bullying**
- I can recognise when someone is upset, hurt or angry online.
- I can describe ways people can be bullied through a range of media (e.g. image, video, text, **chat**).
- I can explain why people need to think carefully about how content they post might affect others, their feelings and how it may affect how others feel about them (their reputation).

**Managing online information**
- I can analyse information to make a judgement about probable accuracy and I understand why it is important to make my own decisions regarding content and that my decisions are respected by others.
- I can describe how to search for information within a wide group of technologies and make a judgement about the probable accuracy (e.g. social media, image sites, video sites).
- I can describe some of the methods used to encourage people to buy things online (e.g. advertising offers; **in-app purchases**, **pop-ups**) and can recognise some of these when they appear online.
- I can explain why lots of people sharing the same opinions or beliefs online do not make those opinions or beliefs true.
- I can explain that technology can be designed to act like or impersonate living things (e.g. **bots**) and describe what the benefits and the risks might be.
- I can explain what is meant by **fake news** e.g. why some people will create stories or alter photographs and put them online to pretend something is true when it isn't.

**Health, Wellbeing and Lifestyle**
- I can describe ways technology can affect health and well-being both positively (e.g. mindfulness apps) and negatively.
- I can describe some strategies, tips or advice to promote health and well- being with regards to technology.
- I recognise the benefits and risks of accessing information about health and well-being online and how we should balance this with talking to trusted adults and professionals.
- I can explain how and why some apps and games may request or take payment for additional content (e.g. **in-app purchases**, **lootboxes**) and explain the importance of seeking permission from a trusted adult before purchasing.

**Privacy and Security**
- I can explain that internet use is never fully private and is monitored, e.g. adult supervision.
- I can describe strategies for keeping personal information private, depending on context.
- I can describe how some online services may seek consent to store information about me; I know how to respond appropriately and who I can ask if I am not sure.
- I know what the **digital age of consent** is and the impact this has on online services asking for consent.

**Y5**

| Computing Systems and Networks: |
| --- |
| **Sharing Information** |

- I can describe that a computer system features inputs, processes, and outputs
- I can explain that computer systems communicate with other devices
- I can explain that systems are built using a number of parts
- I can explain the benefits of a given computer system

- I can identify tasks that are managed by computer systems
- I can identify the human elements of a computer system
- I can explain that data is transferred over networks in packets
- I can explain that networked digital devices have unique addresses
- I can recognise that data is transferred using agreed methods
- I can explain that the internet allows different media to be shared
- I can recognise that connected digital devices can allow us to access shared files stored online
- I can send information over the internet in different ways
- I can compare working online with working offline
- I can make thoughtful suggestions on my group's work
- I can suggest strategies to ensure successful group work
- I can explain how the internet enables effective collaboration
- I can identify different ways of working together online
- I can recognise that working together on the internet can be public or private

## Creating Media:
## Video editing

- I can compare features in different videos
- I can explain that video is a visual media format
- I can identify features of videos
- I can experiment with different camera angles
- I can identify and find features on a digital video recording device
- I can make use of a microphone
- I can capture video using a range of filming techniques
- I can review how effective my video is
- I can suggest filming techniques for a given purpose
- I can create and save video content
- I can decide which filming techniques I will use
- I can outline the scenes of my video
- I can explain how to improve a video by reshooting and editing
- I can select the correct tools to make edits to my video
- I can store, retrieve, and export my recording to a computer
- I can evaluate my video and share my opinions
- 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

## Programming A:
## Selection in physical computing

- I can create a simple circuit and connect it to a microcontroller
- I can explain what an infinite loop does
- I can program a microcontroller to make an LED switch on
- I can connect more than one output component to a microcontroller
- I can design sequences that use count-controlled loops
- I can use a count-controlled loop to control outputs
- I can design a conditional loop
- I can explain that a condition is either true or
- I can program a microcontroller to respond to an input
- I can explain that a condition being met can start an action

- I can identify a condition and an action in my project
- I can use selection (an 'if…then…' statement) to direct the flow of a program
- I can create a detailed drawing of my project
- I can describe what my project will do
- I can identify a real-world example of a condition starting an action
- I can test and debug my project
- I can use selection to produce an intended outcome
- I can write an algorithm that describes what my model will do

## Data and Information:
### Flat file data bases

- 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
- I can choose which field to sort data by to answer a given question
- I can explain what a 'field' and a 'record' is in a database
- I can navigate a flat-file database to compare different views of information
- I can combine grouping and sorting to answer more specific questions
- I can explain how information can be grouped
- I can group information to answer questions
- I can choose multiple criteria to answer a given question
- 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 explain the benefits of using a computer to create graphs
- I can refine a chart by selecting a particular filter
- I can select an appropriate chart to visually compare data
- I can ask questions that will need more than one field to answer
- I can present my findings to a group
- I can refine a search in a real-world context

## Creating Media:
### Vector drawing

- I can discuss how a vector drawing is different from paper-based drawings
- I can identify the main drawing tools
- I can recognise that vector drawings are made using shapes
- I can explain that each element added to a vector drawing is an object
- I can identify the shapes used to make a vector drawing
- I can move, resize, and rotate objects I have duplicated
- I can explain how alignment grids and resize handles can be used to improve consistency
- I can modify objects to create different effects
- I can use the zoom tool to help me add detail to my drawings
- I can change the order of layers in a vector drawing
- 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 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
- I can apply what I have learned about vector drawings
- I can suggest improvements to a vector drawing
- I create alternatives to vector drawings"

| Programming B: |
| Selection in quizzes |

- I can identify conditions in a program
- I can modify a condition in a program
- I can recall how conditions are used in selection
- I can create a program with different outcomes using selection
- I can identify the condition and outcomes in an 'if... then… else...' statement
- I can use selection in an infinite loop to check a condition
- I can design the flow of a program which contains 'if… then… else…'
- I can explain that program flow can branch according to a condition
- I can show that a condition can direct program flow in one of two ways
- I can identify the outcome of user input in an algorithm
- I can outline a given task
- I can use a design format to outline my project
- I can implement my algorithm to create the first section of my program
- I can share my program with others
- I can test my program
- I can extend my program further
- I can identify the setup code I need in my program
- I can identify ways the program could be improved

| Digital Literacy |

**Online Bullying**
- I can recognise online bullying can be different to bullying in the physical world and can describe some of those differences.
- I can describe how what one person perceives as playful joking and teasing (including **'banter'**) might be experienced by others as bullying.
- I can explain how anyone can get help if they are being bullied online and identify when to tell a trusted adult.
- I can identify a range of ways to report concerns and access support both in school and at home about online bullying.
- I can explain how to block abusive users.
- I can describe the **helpline services** which can help people experiencing bullying, and how to access them (e.g. Childline or The Mix).

**Health, Wellbeing and Lifestyle**
- I can describe ways technology can affect health and well-being both positively (e.g. mindfulness apps) and negatively.
- I can describe some strategies, tips or advice to promote health and well- being with regards to technology.
- I recognise the benefits and risks of accessing information about health and well-being online and how we should balance this with talking to trusted adults and professionals.
- I can explain how and why some apps and games may request or take payment for additional content (e.g. **in-app purchases**, **lootboxes**) and explain the importance of seeking permission from a trusted adult before purchasing.

**Privacy and Security**
- I can explain what a **strong password** is and demonstrate how to create one.
- I can explain how many free apps or services may read and share private information (e.g. friends, contacts, **likes**, images, videos, voice, messages, **geolocation**) with others.
- I can explain what app permissions are and can give some examples.

Y6

| Computing Systems and Networks: |
| Internet communication |

- I can compare results from different search engines

- I can complete a web search to find specific information
- I can refine my search
- 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
- I can explain that a search engine follows rules to rank relevant pages
- I can explain that search results are ordered
- I can suggest some of the criteria that a search engine checks to decide on the order of results
- I can describe some of the ways that search results can be influenced
- I can explain how search engines make money
- I can recognise some of the limitations of search engines
- I can choose methods of communication to suit particular purposes
- 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 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

## Creating Media:
## Webpage creation

- I can discuss the different types of media used on websites
- I can explore a website
- I know that websites are written in HTML
- I can draw a web page layout that suits my purpose
- I can recognise the common features of a web page
- I can suggest media to include on my page
- I can describe what is meant by the term 'fair use'
- I can find copyright-free images
- I can say why I should use copyright-free images
- I can add content to my own web page
- I can evaluate what my web page looks like on different devices and suggest/make edits
- I can preview what my web page looks like
- I can describe why navigation paths are useful
- I can explain what a navigation path is
- I can make multiple web pages and link them using hyperlinks
- I can create hyperlinks to link to other people's work
- I can evaluate the user experience of a website
- I can explain the implication of linking to content owned by others

## Programming A:
## Variables in games

- I can explain that the way that a variable changes can be defined
- I can identify examples of information that is variable
- I can identify that variables can hold numbers or letters
- I can explain that a variable has a name and a value
- I can identify a program variable as a placeholder in memory for a single value
- I can recognise that the value of a variable can be changed
- 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
- I can choose the artwork for my project
- I can create algorithms for my project
- I can explain my design choices
- I can choose a name that identifies the role of a variable
- I can create the artwork for my project
- I can test the code that I have written
- I can extend my game further using more variables
- I can identify ways that my game could be improved
- I can share my game with others

## Data and Information:
## Introduction to spreadsheets

- I can answer questions from an existing data set
- I can ask simple relevant questions which can be answered using data
- I can explain the relevance of data headings
- I can apply an appropriate number format to a cell
- I can build a data set in a spreadsheet application
- I can explain what an item of data is
- I can construct a formula in a spreadsheet
- I can explain the relevance of a cell's data type
- I can identify that changing inputs changes outputs
- I can apply a formula to multiple cells by duplicating it
- I can create a formula which includes a range of cells
- I can recognise that data can be calculated using different operations
- I can apply a formula to calculate the data I need to answer questions
- I can explain why data should be organised
- I can use a spreadsheet to answer questions
- I can produce a graph
- I can suggest when to use a table or graph
- I can use a graph to show the answer to questions

## Creating Media:
## 3d modelling

- I can discuss the similarities and differences between 2D and 3D shapes
- I can explain why we might represent 3D objects on a computer
- I can select, move, and delete a digital 3D shape
- I can change the colour of a 3D object
- I can identify how graphical objects can be modified
- I can resize a 3D object
- I can position 3D objects in relation to each other
- I can rotate a 3D object
- I can select and duplicate multiple 3D objects
- I can create digital 3D objects of an appropriate size
- I can group a digital 3D shape and a placeholder to create a hole in an object
- I can identify the 3D shapes needed to create a model of a real-world object
- I can choose which 3D objects I need to construct my model
- I can modify multiple 3D objects
- I can plan my 3D model
- I can decide how my model can be improved

| | |
|---|---|
| • I can evaluate my model against a given criterion | |
| • I can modify my model to improve it | |

**Programming B:**
**Sensing**

- 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
- I can determine the flow of a program using selection
- 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 experiment with different physical inputs
- I can explain that if you read a variable, the value remains
- I can use a condition to change a variable
- I can explain the importance of the order of conditions in else, if statements
- I can modify a program to achieve a different outcome
- I can use an operand (e.g. <>=) in an if, then statement
- 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
- 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"

## Digital Literacy

**Self Image and Identify**
- I can identify and critically evaluate online content relating to gender, race, religion, disability, culture and other groups, and explain why it is important to challenge and reject inappropriate representations online.
- I can describe issues online that could make anyone feel sad, worried, uncomfortable or frightened. I know and can give examples of how to get help, both on and offline.
- I can explain the importance of asking until I get the help needed.

**Online Bullying**
- I can describe how to capture bullying content as evidence (e.g **screen-grab**, **URL**, **profile**) to share with others who can help me.
- I can explain how someone would report online bullying in different contexts.

**Health, Well being and Lifestyle**
- I can describe common systems that regulate age-related content (e.g. **PEGI**, **BBFC**, parental warnings) and describe their purpose.
- I recognise and can discuss the pressures that technology can place on someone and how / when they could manage this.
- I can recognise features of **persuasive design** and how they are used to keep users engaged (current and future use).
- I can assess and action different strategies to limit the impact of technology on health (e.g. **night-shift mode**, regular breaks, correct posture, sleep, diet and exercise).

**Key stage 2 End Point**

*Pupils should be taught to:*
- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.