



COMPUTING CURRICULUM COVERAGE

COMPUTING INTENT

Technology is a quintessential ingredient of modern-day life, developing and transforming the future of the world. Through our computing curriculum, we aim to give our pupils the life-skills that will enable them to embrace and utilise new technology in a socially responsible and safe way in order to flourish. We want our children to become independent and resilient users of technology, having the confidence and critical problem-solving skills required to create content, write programmes and build systems rather than just being passive users.

We aim to deliver the national curriculum for computing in a balanced, stimulating and creative way, providing children with access to a variety of high-quality hardware, software and unplugged resources in order to help them gain an understanding of the foundations, application and implications of computing.

Our curriculum is designed to instil critical thinking, reflective learning and a 'can do' attitude for all our pupils, particularly when engaging with technology and its associated resources. It includes a strong focus on teaching pupils how to use technology safely and responsibly as well as pupils understanding of the importance of governance and legislation regarding how information is used, stored, created, retrieved, shared and manipulated. It is our intent to equip pupils with skills, strategies and knowledge that will enable them to reap the benefits of the online world and technologies whilst being able to minimise risk to themselves or others. Development of computing skills begins in our Foundation stage where we have identified aspects of the Early Years Matters Curriculum which we believe are crucial building blocks for Early Computing.

In line with National Curriculum guidance Computing in KS1 and KS2 is a discrete curriculum subject alongside which pupils are also given opportunities for consolidating and developing computing across the curriculum. With all these elements combined we aim to develop 'digitally competent' learners for a digital age.

Development Matters EYFS: Developing Early Computing

Nursery

Early computing skills: developing Logic, Pattern, Abstraction, Algorithms and Decomposition.

Children should be taught to:

- anticipate
- Name
- Respond to instructions and begin to order things.
- group and compare.
- Talk about why things happen and how things work

Early computing skills; developing collaboration, perseverance and digital literacy

Children should be taught to:

- Remember rules without needing an adult to remind them.
- To recognise, online or offline, that anyone can say 'no' / 'please stop' / 'I'll tell' / 'I'll ask'
- To know that work I create belongs to me.

Early computing skills; developing tinkering and creating.

Children should be taught to:

- Explore how things work
- Match their developing physical skills to tasks and activities in the setting, operating simple equipment.

Reception

Early computing skills: developing Logic, Pattern, Abstraction, Algorithms and Decomposition.

Children should be taught to:

- anticipate and explain
- spot similarities and differences and work out rules.
- Name and label, working out what is important, sticking to the main theme, ignoring what is not important, creating a summary
- Respond to instructions, ordering things, sequence things, introducing storylines, working out different ways to do things, breaking problems down into steps

Early computing skills; developing collaboration, perseverance and digital literacy

Children should be taught to:

- To work with others and take turns.
- Show resilience and perseverance in the face of a challenge.
- Know and talk about the different factors that support their overall health and wellbeing: -sensible amounts of 'screen time'.
- To recognise, online or offline, when makes them feel sad, uncomfortable, embarrassed or upset.
- To identify some simple examples of personal information (e.g. name, address, birthday, age, location).
- To talk about how to use the internet as a way of finding information online.
- To identify devices I could use to access information on the internet.

Early computing skills; developing tinkering and creating.

Children should be taught to:

- Develop their small motor skills so that they can use a range of tools competently, safely and confidently.
- Explore, use and refine a variety of artistic effects to express their ideas and feelings

Development Matters EYFS: Developing Early Computing

Early Computing Goals	Early computing skills: developing Logic, Pattern, Abstraction, Algorithms and Decomposition.		Early computing skills; developing collaboration and perseverance.			Early computing skills; developing tinkering and creating.	
	Children should be taught to: - anticipate and explain - group, compare, spot similarities and differences and work out rules. - Name and label, working out what is important, sticking to the main theme, ignoring what is not important, creating a summary - Respond to instructions, ordering things, sequence things, introducing storylines, working out different ways to do things, breaking problems down into steps		Children should be taught to: - play and work collaboratively - to not give up.			Children should be able taught to: - play and explore, - create, check and fix things	
	Vocabulary: first, next, before, later, soon, after, steps, last, order, parts, same, different, pattern, rule, important, group, order, instructions, sequence		Vocabulary: turn, work together, information, internet			Vocabulary: test, check, change. create, computer, screen, button, control, iPad, tablet, app (application).	
Related Early Learning Goals	Listening, Attention and Understanding	Speaking	Self Regulation	Managing Self	Building Relationships	Fine Motor Skills	Creating with Materials
	- Listen attentively and respond to what they hear with relevant questions, comments and actions during whole class discussions and small group interactions; - Make comments about what they have heard and ask questions to clarify their understanding; - Hold conversation when engaged in back-and-forth exchanges with their teacher and peers. - Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary; - Offer explanations for why things might happen, making use of recently introduced vocabulary - Express their ideas and feelings about their experiences using full sentences, including use of past, present and future tenses and making use of conjunctions, with modelling and support from their teacher.		- Set and work towards simple goals, - Give focused attention to what the teacher says, responding appropriately even when engaged in activity, and show an ability to follow instructions involving several ideas or actions. - Be confident to try new activities and show independence, resilience and perseverance in the face of challenge; - Work and play cooperatively and take turns with others;			- Use a range of small tools - Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function; - Share their creations, explaining the process they have used;	

Computing: Key Stage 1

Digital Literacy(Implications)

Computer Systems and Networks

Safe use

Pupils should be taught to recognise common uses of information technology beyond school

Pupils should be taught to 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

Technology Around us

- Identify examples of technology.
- Identify a computer and name the main parts: screen, base unit, mouse/trackpad and keyboard.
- Switch on and log on a computer.
- To use a mouse in different ways: to open a programme, click and drag and create a picture
- Use a keyboard to type e.g. their name
- To use a keyboard to edit text e.g. delete letters and use arrow keys to move the cursor.
- Save and open their work
- Create rules for using technology responsibly

Challenge:

Explain the purpose of different parts of the computer and how specific keys help them to do their work.

Move to a letter using arrow keys.

Explain how rules benefit them.

Possible Misconceptions: Emphasise the word technology means 'the use of scientific discoveries for practical purposes' or 'things made by people that help us. Technology by this definition therefore does not have to be digital or electronic.

Vocabulary:

computer, screen, i-Pad, app (application), button, control (* From EYFS) mouse, trackpad, keyboard, screen, double-click, Typing, open, save, file, personal information, trusted adult, password, username, log in.

Health, well-being and lifestyle

- To give examples of rules to keep myself safe when using technology both in and beyond the home.
- **Copyright and ownership**
- To explain why work I create using technology belongs to me and say why.
- To save my work under a suitable title / name so that others know it belongs to me (e.g. filename, name on content).
- To understand that work created by others does not belong to me even if I save a copy.
- **Privacy and security**
- To explain that passwords are used to protect information, accounts and devices.
- To recognise more detailed examples of information that is personal to someone (e.g where someone lives and goes to school, family names).
- To explain why it is important to always ask a trusted adult before sharing any personal information online, belonging to myself or others.

Links:

Art
SMSC
Education for a Connected World

Year 1

Computing: Key Stage 1

Information Technology (Applications)

Year 1	Creating Media		Data
	<i>Pupils should be taught to use technology purposefully to create, organise, store, manipulate and retrieve digital content</i>		
	Digital Painting - To describe what different freehand tools do. - To use the shape and line tools. - To make careful choices when painting a digital picture - To explain why I chose the tools I used. - To use a computer on my own to paint a picture - To compare painting a picture on a computer and on paper	Digital Writing - To add and remove text on a computer. - To identify that the look of text can be changed on a computer - To make careful choices when changing text - To use <i>bold, italic, underline and C.Ls</i> - To select a word by double-clicking and all of the text by clicking and dragging. - To explain why I used the tools that I chose - To compare typing on a computer to writing on paper	Grouping Data - To label objects - To identify that objects can be counted - To describe objects in different ways - To count objects with the same properties - To compare groups of objects - To answer questions about groups of objects
	Challenge: Combine different paint tools to achieve a desired effect.	Challenge: Explore the use of the shift key to alter function of keys. Enter increasing amounts of text. Delete with accuracy by positioning the cursor. Use the undo key to reverse changes.	Challenge: Suggest questions that have been asked to group objects
	Possible Misconceptions: Emphasise the eraser tool will erase all layers. If a pupil wants to 'erase' something they have just painted which overlaps with another part of their painting, the undo tool is the better option.	Possible Misconceptions: There may be some confusion around uppercase/lowercase letters, as the keys on a keyboard are uppercase but the letter which shows on screen is lower case.	Possible Misconceptions: Pupils may find grouping the images difficult if they consider them all as images rather than the objects they represent. If this is the case, you may want to use real objects when teaching parts of this unit, for example 2D shapes or small world toys.
	Vocabulary: paint, program, tool, paintbrush, erase, fill, undo, shape tools, line tool, brush style, brush size, colour	Vocabulary: word processor, keyboard, keys, letters, type, space, backspace, text, cursor, toolbar, bold, italic, underline, mouse, select, font, format, undo, redo.	Vocabulary: object, label, group, search, image, property, colour, size, shape, value, data set.
	Links: Art	Links: Writing; Education for a Connected World: -Privacy and Security	Links: Maths; Science; Education for a Connected World: - Copyright and ownership

Computing: Key Stage 1

Computer Science (Foundations)

Programming

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
Pupils should be taught to create and debug simple programs
Pupils should be taught to use logical reasoning to predict the behaviour of simple programs

Moving a Robot

- To explain what a given command will do
- To combine forwards and backwards commands to make a sequence
- To combine four direction commands to make sequences
- To plan a simple program

Programming Animations

- To choose a command for a given purpose
- To show that a series of commands can be joined together
- To identify the effect of changing a value
- To explain that each sprite has its own instructions
- To design the parts of a project
- To use my algorithm to create a program

Challenge:

Choose the order of multiple commands in a sequence and explain what the program should do.
Create and compare different programmes to get to the same place.
Debug suggesting which part of the sequence should be changed and why.

Challenge:

Experiment with blocks containing numbers to look at the impact on the program
Understand that more than one program can be included on a sprite.
Develop programs for multiple sprites explain how they will behave
Use a series of start commands to initialise different programs.

Possible Misconceptions:

Ensure that pupils understand that floor robots can only do what we tell them to do. If the floor robot doesn't behave as we expect, the problem is with the program we put onto it, not the robot not behaving.

Possible Misconceptions:

Explain that in Scratch Jr, a sprite can move forwards, backwards, up and down. The turn block changes the sprites appearance, but not how the sprite moves. This is different to a Bee-bot, which can only move forwards and backwards, and which turns on the spot.

Vocabulary:

forwards, backwards, turn, clear, go, commands, instructions, directions, left, right, algorithm, program, route, Bee-bot
sprite, programming, area, block, start block, run, background, delete, reset, predict, effect, change, value, programming blocks

Links:

Maths
Technology Around Us.
Education for a Connected World
-Privacy and Security

Year 1

Computing: Key Stage 1

Digital Literacy(Implications)

Computer Systems and Networks

Safe use

Pupils should be taught to recognise common uses of information technology beyond school, How is information technology (IT) being used for good in our lives? How does its use in places such as shops, libraries, and hospitals benefit us?

Pupils should be taught to 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. They will learn about responsible use of technology, and how to make smart choices when using it

- To recognise the uses and features of information technology
- To identify that a computer is a part of information technology
- To identify the uses of information technology in the school
- To identify information technology beyond school
- To explain how information technology helps and benefits us looking at bar codes in more detail.
- To explain how to use information technology safely
- To recognise that choices are made when using information technology

Summative Assessment

Challenge:

Research other ways IT helps in everyday lives.
Compare old vs new technology.
Answer: What would happen without this IT?

Possible Misconceptions:

Children may not recognise phones and tablets, as being computers.

Vocabulary:

Technology, computer, mouse, trackpad, keyboard, screen, double-click, typing, open, save, file, personal information, trusted adult, password, username, log in.
(*from Y1)

Information technology(IT), devices, USB, barcode, scanner, scan, click and drag, re-size, document, enter, return, icon, download, private, responsible, digital, avatar, identity, age restrictions, fake, permission

Links:

Education for a Connected World:
Health, well-being and lifestyle

Health, well-being and lifestyle

- To recognise how to use information technology responsibly.
- To recognise some of the choices that are made when using information technology.
- To know how guidance and rules help me and know where to go to for help is concerned.

Self image and Identity

- I can give examples of issues online that might make someone feel sad, worried, uncomfortable or frightened; I can give examples of how they might get help.

Privacy and security

- To explain how passwords can be used to protect information, accounts and devices.
- To explain and give examples of what is meant by 'private' and 'keeping things private'.
- To describe and explain some rules for keeping personal information private (e.g. creating and protecting passwords).
- To explain how some people may have devices in their homes connected to the internet and give examples (e.g. lights, fridges, toys, televisions).

Managing online information

- To identify that some images are not real/fake

Year 2

Computing: Key Stage 1

Information Technology (Applications)

Year 2

Creating Media

Data

Pupils should be taught to use technology purposefully to create, organise, store, manipulate and retrieve digital content.

- To use a digital device to take a photograph
- To make choices when taking a photograph
- To describe what makes a good photograph
- To decide how photographs can be improved
- To use tools to change an image
- To recognise that photos can be changed.

Rubric Assessment

- To say how music can make us feel
- To identify that there are patterns in music
- To use a computer to create a musical pattern.
- To create music for a purpose
- To review and refine my musical pattern on a computer
- To save my work and re-open it

Rubric Assessment

- To recognise that we can count and compare objects using tally charts
- To recognise that objects can be represented as pictures
- To create a pictogram.
- To select objects by attribute and make comparisons
- To recognise that people can be described by attributes
- To explain that we can present information using a computer.

Summative Assessment

Challenge:

Use different tools to enhance a photograph. Take a photo from 3 different angles or of the same object for three different purposes or to tell a specific story.

Challenge:

Create multiple sequences of notes on the computer and refine them to make improvements. Create and compare more than one version.

Challenge:

Create a pictogram about a real-life question that matters to them.

Possible Misconceptions:

Emphasise that digital photographs do not always represent what was actually seen

Possible Misconceptions:

Emphasise the computer is making the sounds, but the children composed the music. Even when creating media using a digital device, there is still an element of creativity.

Possible Misconceptions:

The use of a single image throughout a pictogram helps with consistency when pupils are introduced to using many-to-one correspondence in pictograms where a symbol represents more than one, for example 2, 5 or 10. Because of these differences, you may want to teach this unit prior to teaching pictograms in mathematics.

Vocabulary:

Image, background, save, file (*Y1) device, camera, photograph, capture, digital, landscape, portrait, framing, subject, compose, flash, focus, editing, filter, format, select, effect, colour, hue, adjustments, version

Vocabulary:

open (*from KS1) , edit

Vocabulary:

data, object, group (*From Y1) , enter, attribute, tally chart, pictogram, block diagram

Links : art ; *Education for a Connected World* - *Self image and identity*

Links : music; *Education for a Connected World* - *Copyright and Ownership*

Links : maths; *Education for a Connected World*- *Privacy and Security*

Computing: Key Stage 1

Computer Science (Foundations)

Programming

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
Pupils should be taught to create and debug simple programs
Pupils should be taught to use logical reasoning to predict the behaviour of simple programs

Year 2

Robot Algorithms.

- To describe a series of instructions as a sequence
- To explain what happens when we change the order of instructions
- To use logical reasoning to predict the outcome of a program (series of commands)
- To explain that programming projects can have code and artwork
- To design an algorithm
- To create and debug a program that they have written

Rubric Assessment

An Introduction to Quizzes.

- To explain that a sequence of commands has a start
- To explain that a sequence of commands has an outcome.
- To create a programme using a given design.
- To change a given design.
- To create a programme using my own design.
- To decide how my project can be improved.

Rubric Assessment

Challenge:

Execute a program on to a floor robot to reach multiple given points.
Plan and test mat layouts with several different ways of achieving the same destination.

Which algorithm is more efficient and why?

Can you improve this algorithm?

Which step doesn't work? Explain why?

Challenge:

Explain what multiple event blocks do and how using the numbers on ScratchJr blocks can create a more efficient program.

Adapt designs using familiar blocks not given in examples and create program for a quiz to include multiple questions, sprites incorporating multiple actions and different backgrounds, debugging as they go.

Reorder to make the quiz harder or easier and predict and explain how changes will affect how users experience the quiz.

Possible misconceptions:

Children may need support to see that if the outcome isn't expected, it is the program and not the computer.

Possible misconceptions:

When learning that different sequences can have the same outcome, children might think that order isn't important. Alongside showing pupils the sequences on the screen, demonstrate them running in Scratch Jr simultaneously to show that though the outcome is the same, the movement to get there is different.

Links:

Maths- Education for a Connected World
- Copyright and ownership

Vocabulary:

instruction, algorithm, program, commands, prediction, route, design, run, start, clear (*Y1)
sequence, order, unambiguous, debugging, outcome, actions, modify, features, evaluate

Computing: Key Stage 2

Digital Literacy(Implications)

Computer Systems and Networks

Safe use

Pupils should be taught to 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

Pupils should be taught to 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. They will learn about responsible use of technology, and how to make smart choices when using it

- To explain how digital devices function
- To identify input and output devices.
- To recognise how digital devices can change the way we work
- To explain how a computer network can be used to share information
- To explore how digital devices can be connected
- To recognise the physical components of a network

Summative Assessment

Challenge:

Compare wired and wireless connections and explain **advantages and disadvantages** of each. Decide which type of connection would be best in different situations and explain why. Design a simple network for a classroom or home and explain their choices.

Copyright and Ownership

- To explain why copying someone else's work from the internet without permission isn't fair and can explain what problems this might cause.

Managing online information

- To know how to use key phrases in search engines to gather accurate information online.
- To explain what autocomplete is and how to choose the best suggestion.
- To explain the difference between a 'belief', an 'opinion' and a 'fact. and give examples of how and where they might be shared online, e.g. in videos, memes, posts, news stories etc.

Possible Misconceptions:

Make children aware that a digital device is capable of some processing, i.e. it has functions beyond being either on or off. Some devices e.g. an i-Pad can identified as an input and an output.

Children may think that a Wi-Fi connection is an internet connection; this is wrong, it is just a wireless way of connecting to a network. Equally, lthey may mention 3G, 4G, or 5G connections, which connect devices (usually smartphones) to the internet and not solely to a network.

Vocabulary:

digital device, input, process, output, program, digital, non-digital, connection, network, network switch. server, wireless access point, network cables, network sockets, secure, search, reliable, report, fair, ownership, copyright

Year 3

Computing: Key Stage 2

Information Technology (Applications)

Year 3	Creating Media		Data
	Pupils should be taught to 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		
	Stop-frame animation - To explain that animation is made up of a sequence of images (drawings or photographs). - To relate animated movement with a sequence of images - To plan an animation - To identify the need to work consistently and carefully - To review and improve an animation - To evaluate the impact of adding other media to an animation Rubric Assessment	Desktop Publishing - To recognise how text and images can be used together to convey information - To recognise how text and layout can be edited. - To choose appropriate page settings - To add content to a desktop publishing publication - To consider how different layouts can suit different purposes - To consider the benefits of desktop publishing Rubric Assessment	Branching Databases - To investigate questions with yes/no answers - To identify the object attributes needed to collect relevant data - To create a branching database - To explain why it is helpful for a database to be well structured - To identify objects using a branching database - To compare the information shown in a pictogram with a branching database Summative Assessment
	Challenge: Include flying objects Identify improvements and make those changes Use additional media to enhance the animation	Challenge: Change the background colours and add word art. Change text, including resizing, colours, and font types.	Challenge: Which question splits the objects more evenly? Why does that matter? Design a branching database for a real-world purpose
	Possible Misconceptions: When recording, explain the importance of clicking the correct button to get to the right place in the animation before resuming and taking more photos (otherwise it will start adding photos into different parts of the animation).	Vocabulary: text, images, font, landscape, portrait , (*from KS1), font style, template, orientation, placeholder, layout, content, desktop publishing, copy, paste,	Possible Misconceptions: Questions within branching databases must have a yes/no answer. Prompt children to start their questions using 'does it?' and 'is it?'
	Vocabulary: image, photograph, sequence (*from year 2), animation, flip book, stop frame animation, frame, onion skinning, media, import, transition.	Vocabulary: text, images, font, landscape, portrait , (*from KS1), font style, template, orientation, placeholder, layout, content, desktop publishing, copy, paste,	Vocabulary: attribute, value, objects, pictogram (from KS1), table, database, branching database, selecting, decision tree
	Links: English/ History	Links: English	Links: Science

Computing: Key Stage 2

Computer Science (Foundations)

Programming

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
Pupils should be taught to use sequence, selection, and repetition in programs; work with variables and various forms of input and output
Pupils should be taught to use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

Year 3

Sequence in Music

- To explore a new programming environment
- To identify that commands have an outcome
- To explain that a program has a start
- To recognise that a sequence of commands can have an order
- To change the appearance of my project
- To create a project from a task description

Rubric Assessment

Challenge:

Identify the attributes of the sprite, for example, code, costume, and sound
Change the appearance of the sprite and backdrop in response to user input
Identify aspects of the algorithm that can be reused for subsequent sprites
Give multiple examples of sequences including in algorithms

Possible Misconceptions:

Emphasize that an event command (e.g. when green flag is clicked) is needed to start their program. When working with multiple sprites on Scratch, make sure children click on the sprite to bring up its individual code tab, before starting.

Vocabulary:

programming, blocks, commands, code, sprite, sequence, algorithm, bug, debug, design, resize, run (*from KS1) costume, stage, backdrop, motion, point in direction, go to, glide, event, action, order, logic, extension block, pen up, set up, errors

Events in Action

- To explain how a sprite moves in an existing project
- To create a program to move a sprite in four directions
- To adapt a program to a new context
- To develop my program by adding features
- To identify and fix bugs in a program
- To design and create a maze-based challenge

Summative Assessment

Challenge:

Design programs for specific users.
Create a program where one event triggers multiple actions across several sprites.
Fix partially broken event driven programs.

Possible Misconceptions:

Reinforce that Scratch uses x and y coordinates. The stage works as a grid, so x and y coordinate numbers indicate locations on the stage. The x coordinate gives the left-right position, and the y coordinate gives the up-down position. Children may get confused when changing x/y by 10/-10. Support by searching 'xy-grid' on the backdrops of Scratch and using the provided background image.

Links:

Education for a Connected World
- Copyright and ownership
- Managing online information

Computing: Key Stage 2

		Digital Literacy(Implications)
Year 4	Computer Systems and Networks	Safe use
	<i>Pupils should be taught to 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</i>	<i>Pupils should be taught to 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. They will learn about responsible use of technology, and how to make smart choices when using it</i>
	- To describe how networks physically connect to other networks - To recognise how networked devices make up the internet - To outline how websites can be shared via the World Wide Web (WWW) - To describe how content can be added and accessed on the World Wide Web (WWW) - To recognise how the content of the WWW is created by people - To evaluate the consequences of unreliable content Summative Assessment	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 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. - I can describe ways of identifying when online content has been commercially sponsored or boosted, (e.g. by commercial companies or by vloggers, content creators, or influencers). - I can describe how fake news may affect someone's emotions and behaviour and explain why this may be harmful.
	Challenge: Can you explain how information travels across the internet? What happens if part of the network fails? Why is the internet different from a local network?	Copyright and Ownership - When searching on the internet for content to use, I can explain why I need to consider who owns it and whether I have the right to reuse it. - I can give some simple examples of content which I must not use without permission from the owner, e.g. videos, music, images.
	Possible Misconceptions: Reinforce that the internet and world wide web are not the same thing. The Internet is a global system of computer networks, whereas the World Wide Web is an application that runs on the internet, which can be accessed through websites. Children may confuse search engines and browsers. However, a browser is a piece of software that retrieves and displays web pages, such as Chrome, Firefox, etc. In contrast, Google is a search engine that use crawlers to find specific information on the web.	Self Image and Identity - To describe positive ways for someone to interact with others online and understand how this will positively impact on how others perceive them. - To explain that others online can pretend to be someone else, including my friends, and suggest reasons why they might do this.
	Vocabulary: permission, download, website (* from KS1) ownership, network, network switch, wireless access point (WAP), internet, World Wide Web, permission (* from Year 3) internet, router, network security, server, website, web page, web address, routing, web browser, content, links, files, adverts, sceptical, verify, fake news, positive online communication, online persona, victim, report, block, CEOP, Childline	

Computing: Key Stage 2

Information Technology (Applications)

Year 4	Creating Media		Data
	Pupils should be taught to 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		
	Audio Editing - To recognise the different parts of a podcast. - To apply audio editing skills. - To combine different types of audio and played together. - To evaluate effective use of audio. Rubric Assessment	Photo Editing - To know that digital images can be changed. - To change the composition of an image- colour. - To know how cloning can be used in photo editing. - To explain how images can be combined. - To combine images for a purpose. - To evaluate how changes can improve an image Rubric Assessment	Data logging - To explain that data gathered over time can be used to answer questions - To use a digital device to collect data automatically - To explain that a data logger collects 'data points' from sensors over time - To identify the data needed to answer questions. - To use data from sensors to answer questions. Rubric Assessment
	Challenge: Outline why selected sounds will add to the podcast's key message. Which edit made the biggest improvement and why?	Challenge: Purposefully combine images and edit to correct errors, enhance details, adding creative effects, and convey given or chosen messages. Possible Misconceptions: Reinforce that cropping changes the image composition by removing parts of it, while resizing changes the image dimensions. More filters and effects does not always improve an image; overuse can lead to unnatural results. Vocabulary: Image, edit, undo, save, select, digital, compose, composition, effects, colours, hue, adjustments, version, font style (*from KS1) copyright (*from Y3), arrange, crop, pixels, rotate, flip, hue/saturation, sepia, illustrator, vignettere, touch, clone, recolour, magic wand, select, adjust, sharpen, brighten, composite, alter, background, foreground, publication, elements, original, border, layer	Challenge: What does the data not tell us? Suggest questions that require data from more than one sensor and/or time frame to answer them. Suggest the time frame that will offer the most varied data Evaluate the most effective place to collect data
	Possible Misconceptions: Reinforce saving a project keeps the ability to edit, whereas exporting creates a final audio file that cannot be re-edited in the same way.		Possible Misconceptions: Reinforce that accuracy can be influenced by difference factors, such as sensor quality, environmental conditions and user errors.
	Vocabulary: open, save, file, edit, speaker, headphones, record (*from KS1) input, output, (*from Y3), audio, playback, pause, podcast, selection, mixing, time shift, export, MP3		Vocabulary: data, (*from KS1) table, input, device, (*from Y3), data logger, sensor, data point, interval, analyse, data set, import, export
	Links: Science- Sound/ English	Links: Education for a connected world	Links: Maths and Science

Computing: Key Stage 2

Computer Science (Foundations)

Programming

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
Pupils should be taught to use sequence, selection, and repetition in programs; work with variables and various forms of input and output
Pupils should be taught to use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

Year 4

Repetition in Shapes

- To identify that accuracy in programming is important
- To create a program in a text-based language
- To explain what 'repeat' means
- To modify a count-controlled loop to produce a given outcome
- To decompose a task into small steps
- To create a program that uses count-controlled loops to produce a given outcome

Summative Assessment

Challenge:

Can you make the code snippet more efficient?

Possible Misconceptions:

Reinforce that right and left code merely turns the turtle a set number of degrees. Support in taking into account the turtle's starting position and orientation. . Emphasise that even small errors can cause the program to fail. Repetition allows for efficient and scalable code.

Links:

Education for a Connected World:
-Copyright and ownership
-Self-image and identity

Repetition in Games

- To develop the use of count-controlled loops in a different programming environment
- To explain that in programming there are infinite loops and count controlled loops
- To develop a design that includes two or more loops which run at the same time
- To modify an infinite loop in a given program
- To design a project that includes repetition

Rubric Assessment

Challenge:

Identify how additional sprites may need to be modified to enhance the game, for example, use wait blocks to stagger the timing of sprites appearing. Identify aspects of the algorithm that can be reused for additional sprites. Include additional code that enhances the function of the game and reflects design choices.

Possible Misconceptions:

Infinite loops can be repeated without an end (forever loop), whereas count-controlled loops will run for a set number of times (repeat _ times). Children may believe that infinite loops are the easiest to use, however they can get stuck, and the only way to stop them is to close the program and start again.

Vocabulary:

program, command, algorithm, design, debug, value, programming, sprite, blocks, code, (*from KS1) code snippet, logo commands, pattern, repeat, repetition, loop, count-controlled loop, trace, decompose, procedure, infinite loop, animate, costume, event block, duplicate, modify

Computing: Key Stage 2

		Digital Literacy(Implications)
Year 5	Computer Systems and Networks	Safe use
	<i>Pupils should be taught to 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</i>	<i>Pupils should be taught to 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. They will learn about responsible use of technology, and how to make smart choices when using it</i>
	- To explain that computers can be connected together to form systems - To recognise the role of computer systems in our lives - To experiment with search engines. - To describe how search engines select results. - To explain how search engines are ranked. - To recognise why the order of results is important and to whom. Summative Assessment	Copyright and Ownership - To assess and justify when it is acceptable to use the work of others. - To give examples of content that is permitted to be reused and know how this content can be found online Self image and Identity - To explain how identity online can be copied, modified or altered. - To know how to make responsible choices about having an online identity, depending on context. Online relationships - To describe some of the ways people may be involved in online communities and describe how they might collaborate constructively with others and make positive contributions. (e.g. gaming communities or social media groups). Online reputation - To describe ways that information about anyone online can be used by others to make judgments about an individual and why these may be incorrect.
	Challenge: Why is the order of search results important for users? Can a search engine ever be "wrong" or biased? How?	
	Possible Misconceptions: Reinforce that a system is not just a single device, but an interconnected set of components that work together to perform a function. Ensure they know that Search engines index the internet and retrieve information from their indexed database, they are not searching live. the first result is based on the search engine's ranking criteria and might not be the best for the user's need.	
	Vocabulary: digital, input, process, output positive online communication (* from Y3/4), connection, system, protocol, address, packet, slide deck, chat, remix, digital footprint, copyright, infringe, plagiarism, illegal downloads, streaming, hub, social network,	Links; Education for a Connected World: RSE

Computing: Key Stage 2

Information Technology (Applications)

Year 5	Creating Media		Data
	Pupils should be taught to 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		
	Vector drawing - To identify that drawing tools can be used to produce different outcomes - To create a vector drawing by combining shapes - To use tools to achieve a desired effect - To recognise that vector drawings consist of layers - To group objects to make them easier to work with - To apply what I have learned about vector drawings. Rubric Assessment	Video Editing - To explain what makes a video effective - To identify digital devices that can record video - To capture video using a range of techniques - To create a storyboard - To identify that video can be improved through reshooting and editing - To consider the impact of the choices made when making and sharing a video Rubric Assessment	Flat-file databases - To use a form to record information - To compare paper and computer-based databases - To outline how you can answer questions by grouping and then sorting data. - To explain that tools can be used to select specific data - To explain that computer programs can be used to compare data visually - To use a real-world database to answer questions. Summative Assessment
	Challenges: Purposefully use filming techniques. Combine video and audio to enhance visuals on screen.	Challenges: Enhance the drawing by adding additional objects, for example to represent light and shade. Position objects to make more complex shapes. Combine grouped objects together to form bigger groups Ungroup objects to make a change and then regroup as necessary.	Challenges: Can you redesign the database to make it easier to search? Who would find this database useful in real life?
	Possible Misconceptions Emphasise that editing does not have to be done in a linear order and involves arranging clips, adding effects, transitions, audio and ensuring the video flows coherently. Overuse of special effects can look cluttered and distract from content.	Combine grouped objects together to form bigger groups Ungroup objects to make a change and then regroup as necessary.	Possible Misconceptions Emphasise that fields are the specific categories of information (the columns in a table with headings for each category) and records are the complete set of information for each entry in the database (the row in a table, each representing a complete set of related info).
	Vocabulary: drawing tools, object, toolbar, move, resize, colour, order, copy, paste, duplicate (*from KS1/ Y3/4) vector, rotate, duplicate, zoom, align, layers, group, ungroup, reflection, vector drawing Links: Art	Vocabulary: video, audio, camera, close up, microphone, lens, import, editing, clip (*from KS1/Y3/4) talking head, panning, mid range, long shot, moving subject, side by side, angle, static camera, zoom, tilt, storyboard, split, trim, reshoot Links: Education for a Connected World: --Online relationships	Vocabulary: data, group, value (*From KS1/Y3/Y4) sort, order, database, record, criteria, graph, chart, filter, axis, Links: Maths

Computing: Key Stage 2

Computer Science (Foundations)

Programming

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

Pupils should be taught to use sequence, selection, and repetition in programs; work with variables and various forms of input and output

Pupils should be taught to use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

Selection in Physical Computing

- To control a simple circuit connected to a computer
- To write a program that includes count-controlled loops
- To explain that a loop can stop when a condition is met
- To explain that a loop can be used to repeatedly check whether a condition has been met
- To design a physical project that includes selection
- To create a program that controls a physical computing project

Rubric Assessment

Selection in Quizzes

- To explain how selection is used in computer programs
- To relate that a conditional statement connects a condition to an outcome
- To explain how selection directs the flow of a program
- To design a program which uses selection
- To create a program which uses selection
- To evaluate my program

Summative Assessment

Challenge:

Construct a wiring diagram detailing the pads to be used on each component
Build a model informed by the limitations of the hardware (for example, not placing LEDs on the rotating disc)
Explain how conditions and loops have been used in the algorithm to create a selection statement

Challenge:

Create quizzes where different answers lead to different follow-up questions.

Possible Misconceptions: explicitly demonstrate that an *if...then...* statement only checks once unless placed inside a loop, and model how loops repeatedly check conditions (e.g. "until button A is pressed"). Pupils may also confuse conditions with actions; consistently identify and label the condition (a true/false statement) and the resulting commands when teaching algorithms and in Crumble's *if...then...* block. Pupils may also not realise that each loop cycle completes before the condition is checked again; use step-by-step tracing and debugging tasks to make program flow explicit.

Vocabulary:

infinite loop, input, output, repetition, count controlled loop, switch, connect, connection, program, action, debug, algorithm, design, task, test, run (*From KS1/ Y3/4) components, Microcontroller, motor, Crumble controller, LED, Sparkle, crocodile clips, battery box, condition, selection, condition, conditional statement, outcomes, implement

Links:

Education for a Connected:
-Copyright and ownership
Science
D.T

Computing: Key Stage 2

Digital Literacy(Implications)

Computer Systems and Networks

Pupils should be taught to 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

Concepts

- To explain the importance of internet addresses
- To recognise how data is transferred across the Internet.
- To explain how sharing information online can help people work together.
- To evaluate different ways of working together online.
- To recognise how we communicate using technology
- To evaluate different methods of online communication

Summative Assessment

Challenge:

Evaluate at least two ways of sharing the same information (e.g. email, shared document, learning platform) and explain which is most efficient, most secure and most suitable for collaboration. Choose sharing methods for specific scenarios.

Possible Misconceptions;

That they can only work collaboratively because they are physically in the same room. If it is not possible for children to work in different locations, keep reminding them that this way of working would work whether they were next to each other or hundreds of miles apart.

Links:

Education for a Connected World:
 - Managing online information
 - Online reputation

Safe use

Pupils should be taught to 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. They will learn about responsible use of technology, and how to make smart choices when using it

Copyright and Ownership

- To use of search tools to find and access online content which can be reused by others.
- To know how to make references to and acknowledge sources I have used from the internet.
- **Self image and Identity**
- To 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.

Managing online information

- To describe how things shared privately online can have unintended consequences for others. e.g. screen-grabs.
- To explain that taking or sharing inappropriate images of someone (e.g. embarrassing images), even if they say it is okay, may have an impact for the sharer and others; and who can help if someone is worried about this.

Online reputation

- To explain strategies anyone can use to protect their 'digital personality' and online reputation, including degrees of anonymity.

Privacy and Security

- To describe how and why people should keep their software and apps up to date, e.g. auto updates.

Vocabulary:

search, search engine, Google, links, selection, communication, Internet, plagiarism, infringe, copyright, Bing, Yahoo!, Swisscows, DuckDuckGo, refine, index, web crawler, bot, ranking, optimisation, content creator, public, private, SMS, WhatsApp, blog, Twitter, reference, acknowledge, blocking, antivirus, adware, malware, Trojan, firewall, security updates, cookie, junkmail, pop up blocker, scams, phishing, screen grab, anonymity

Year 6

Computing: Key Stage 2

Information Technology (Applications)

Year 6	Creating Media		Data
	<i>Pupils should be taught to 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</i>		
	3D Modelling - To use a computer to create and manipulate three-dimensional (3D) digital objects - To compare working digitally with 2D and 3D graphics - To construct a digital 3D model of a physical object - To identify that physical objects can be broken down into a collection of 3D shapes - To design a digital model by combining 3D objects - To develop and improve a digital 3D model Rubric Assessment	Web Page Creation - To review an existing website and consider its structure - To plan the features of a web page - To consider the ownership and use of images (copyright) - To recognise the need to preview pages - To outline the need for a navigation path - To recognise the implications of linking to content owned by other people Rubric Assessment	Spreadsheets - To identify questions which can be answered using data - To explain that objects can be described using data - To explain that formulas can be used to produce calculated data - To apply formulas to data, including duplicating - To create a spreadsheet to plan an event - To choose suitable ways to present data Summative Assessment
	Challenge: Can you choose 3D shapes that can be combined to create more complex shapes? Can you evaluate size and position viewing objects from different perspectives? Can you duplicate and ungroup objects to create variations of models?	Challenge: Can you use additional features (editing, image carousels, maps) ? Can you add, organise, and link multiple pages and embedded content to enhance your website? Can you make references or acknowledgements to show that you understand fair use? How does your design take into consideration the limitations of the software?	Challenge: Can you create a formula that combines more than one calculation (e.g. total + average)? Can you build a formula using brackets to control order of operations? Can you design a spreadsheet to : Plan a school event budget Compare mobile phone contracts Track class reading scores
	Possible Misconceptions: Encourage children to repeatedly look at their design from different angles, and ensure it looks as expected from each. For example, a design can easily look 'lined up' viewed from the side, but from the top it becomes clear the shapes are offset. Model checking from all angles repeatedly when you demonstrate the software.	Possible Misconceptions: Emphasise website builders such as Google Sites use drag and drop pre-coded elements instead of users having to create their own code.	Possible Misconceptions: x to * for multiply can be confusing. Explain that as a person, they know that x can be a letter or a multiply, but a spreadsheet can't know it as two things. Because of this, a spreadsheet only knows it as a letter and another symbol had to be chosen as multiply. Remind pupils that calculations in maths can be written either way $6 = 2 + 4$ is the same as $2 + 4 = 6$. A spreadsheet only knows it is being asked to do maths (calculate a formula) if the equals is at the start.
	Vocabulary: 2D, 3D, resize, colour, rotate, position, select, duplicate, group, ungroup, placeholder, object, resize, design, modify, evaluate 3D object, 3D space, view, lift, dimensions, hole	Vocabulary: Website, web page, browser, media, logo, layout, header, device, evaluate Hypertext Markup Language (HTML), copyright, fair use, preview, Google sites, breadcrumb trail, navigation, hyperlink, subpage, implication, external link, embed.	Vocabulary: data, data set, columns, rows, attribute, input, output, duplicate, graph, tools, chart, evaluate, spreadsheets, data heading, cells, data item, common attribute, format, formula, calculation, cell reference, operation, sigma, results, comparison, software,
	Links: Education for a Connected World: <i>Online relationships -Copyright and Ownership; Art and Design; DT and Maths</i>	Links: Education for a Connected World: <i>Copyright and ownership and English</i>	Links: Education for a connected world- Managing info; Maths and Science

Computing: Key Stage 2

Computer Science (Foundations)

Programming

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
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Pupils should be taught to use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

Year 6

Variables in Games

- To define a 'variable' as something that is changeable
- To explain why a variable is used in a program
- To choose how to improve a game by using variables
- To design a project that builds on a given example
- To use my design to create a project
- To evaluate my project

Summative Assessment

Challenge:

Can you enhance your game? E.g. combine multiple variables to create complex behaviors (e.g., player score + time remaining → bonus).
Introduce random numbers to vary enemy speed, spawn location, or item placement.
Trigger new events based on variable values (e.g., after score = 50, spawn a boss).
Change background or music when certain variables reach thresholds.

Possible Misconceptions:

Children may misinterpret the meaning of the word 'variable,' within programming with their understanding from Science where the word has a slightly different meaning.
Emphasise that in programming, a variable holds a piece of data, it can only hold one piece of data at once and this can change throughout the program.
Also emphasise that although score is one example of a variable, it is not the only one.

Vocabulary:

change, name, value, variable, set, change, design, event, algorithm, code, task, program, test, debug, evaluate, input output, process, USB, Micro:bit, MakeCode, selection, condition, random, sensing, accelerometer, navigation, step counter

Links:

Education for a Connected World:
-Privacy and Security
Science and D.T

Sensing

- To create a program to run on a controllable device
- To explain that selection can control the flow of a program
- To update a variable with a user input
- To use a conditional statement to compare a variable to a value
- To develop a program to use inputs and outputs on a controllable device

Rubric Assessment

Challenge:

What real-world system uses the same decision logic as your program?
E.g. a smart plant monitor or thermostat.

Possible Misconceptions:

Show that variables **store values** (like step count) and must be updated by code; they don't count automatically. Demonstrate that the accelerometer detects motion patterns, not steps directly, and show how thresholds or conditions control counting. Compare to fitness trackers or smartwatches to explain **accuracy limitations** and why step counts may vary.

Links:

Education for a Connected World:
-Privacy and Security