

Queenswood Primary School and Nursery

Computing Curriculum Progression



Computing Curriculum Intent and Implementation

At Queenswood, Computing is taught as part of a STEM (Science, technology, engineering and mathematics) curriculum, where pupils learn to take risks, become resourceful, innovative, enterprising and capable citizens. STEM lessons happen at least once a week. It is our intent that problem solving is at the heart of learning in this subject area - all STEM lessons are built around the school's progression in thinking skills. It is also encouraged that this thinking approach is developed in all subject areas, when approaching problems. We believe that our children need exposure to risk, challenge and practical problems, in order to ensure they have the skills, knowledge and personal development to meet the challenges that the real-world presents.

All strands of the thinking skills (planning, developing and reflecting) are developed through computing, with a particular focus on gathering information, thinking about cause and effect, thinking logically and critically and seeking patterns.

There are four strands to the computing curriculum at Queenswood:

- Computing Systems and Networks
- Creating Media
- Data and Information
- Programming and Algorithms

The skills of using tools effectively, evaluating information, understanding the impact of technology and design and development run across all four of these strands.

Pupils are taught in cross-curricular topics, making use of links with other subject such as PSHE, literacy, history and geography whenever possible. Our curriculum ensures children gain the knowledge and skills required by the National Curriculum, whilst having plenty of opportunity to re-visit content to ensure it is embedded. The 2-year rolling programme of content coverage is well-designed to promote new learning that is built on prior learning.

To support the sequencing of the learning, as well as teacher's subject knowledge, we use the NCCE scheme of work to teach each unit as set out in our curriculum map.

The progression below outlines the skills required as children repeat working with different concepts and technology but are taught a greater level of skill, knowledge and understanding as they progress in their computing learning journey.

To assure that children are retaining the knowledge learned during each unit, a mind-map will be used for children to collect new knowledge and link it with prior learning. At the end of a unit, children will demonstrate their learning by creating 'My Memory Mind-Map' demonstrating the knowledge they have gained, which they will take on to future learning.

Safeguarding commitment:

Through our computing curriculum, children will gain independent problem-solving skills, as well as develop the skills for quality teamwork. Through our programming curriculum children will learn and develop greater resilience and perseverance in order to be successful when faced with challenges.

Children will be taught explicitly about e-safety and online risks. They will discuss not only how to stay safe online, but also what to do if they feel unsafe or know other children are behaving in an un-safe manner. E-safety is taught both through our PSHE scheme of work – Jigsaw, and in Key Stage 2 additional units from Google’s Internet Legends scheme of work are used to strengthen the knowledge and understanding of keeping safe in a digital world. Both of these schemes are aligned to Education for a Connected World 2020, and ensure our children are prepared well for the next step in their digital journey.

Modern British Values and SMSC are embedded throughout the curriculum at Queenswood, and the computing curriculum allows children to develop their understanding of the individual liberty and the rule of law, particularly when learning about information ownership, copyright and internet safety. The internet allows a window into the world and therefore allows study of and contact with different religions, cultures and traditions, and this is taught responsibly with a focus on identifying reliable sources of information and making comparisons between different sources of information.

Computing Systems and Networks		
KS1	Lower KS2	Upper KS2
<ul style="list-style-type: none"> -I can list different uses of information technology - I can recognise that information technology can be connected - 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 use a mouse to open a program - I can save my work to a file - I can open my work from a file - I can identify rules to keep us safe and healthy when we are using technology in and beyond the home - I can recognise how to use information technology responsibly - I can explain simple guidance for using information technology in different environments and settings - I can identify the choices that I make when using information technology - I can sort devices into old and new 	<ul style="list-style-type: none"> - I can explain how I use digital devices for different activities - I can recognise similarities between using digital devices and non-digital tools - I can suggest differences between using digital devices and non-digital tools - I can demonstrate how information can be passed between devices - I can explain the role of a switch, server, and wireless access point in a network - I can recognise that a computer network is made up of a number of devices - I can identify how devices in a network are connected with one another - I can identify networked devices around me - I can identify the benefits of computer networks - I can discuss why we need a network switch - I can explain how messages are passed through multiple connections - I can recognise different connections - I can demonstrate how information can be passed between devices - I can explain the role of a switch, server, and wireless access point in a network - I can demonstrate how information is shared across the internet - I can describe the internet as a network of networks 	<ul style="list-style-type: none"> -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 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 - 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

	<ul style="list-style-type: none"> - I can discuss why a network needs protecting - I can describe the different networked devices and how they connect - I can explain how the internet allows us to view the World Wide Web - I can recognise that the World Wide Web is the part of the internet that contains websites and web pages - 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. 	<ul style="list-style-type: none"> - 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 recognise some of the limitations of search engines - I can decide when I should and should not share - I can explain that communication on the internet may not be private
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Creating Media		
KS1	Lower KS2	Upper KS2
<p>DIGITAL WRITING</p> <ul style="list-style-type: none"> - I can open a word processor - I can enter text into a computer - I can identify the toolbar and use bold, italic, and underline - I can type capital letters - I can change the font - I can select a word by double-clicking - I can select all of the text by clicking and dragging - I can decide if my changes have improved my writing - I can use 'undo' to remove changes" - I can move and resize images <p>DIGITAL PAINTING</p> <ul style="list-style-type: none"> - I can use the paint tools to draw a picture, including shape, line, colour, and brush style - I can create a picture in the style of an artist - I can explain that pictures can be made in lots of different ways 	<p>DESKTOP PUBLISHING</p> <ul style="list-style-type: none"> - I can explain the difference between text and images - I can identify the advantages and disadvantages of using text and images - I can change font style, size, and colours for a given purpose - I can edit text - 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 - I can choose a suitable layout for a given 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 	<p>WEBSITES</p> <ul style="list-style-type: none"> - 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 add content to my own web page - I can describe why navigation paths are useful - I can make multiple web pages and link them using hyperlinks - I can create hyperlinks to link to other people's work - I can explain the implication of linking to content owned by others <p>DRAWING</p> <ul style="list-style-type: none"> - I can discuss how a vector drawing is different from paper-based drawings - I can identify the main drawing tools - 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

PHOTOGRAPHY

- I can take photos in both landscape and portrait format
- 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 focus on an object
- I can recognise that images can be changed
- I can use a tool to achieve a desired effect
- I can identify which images are real and which have been changed

SOUND

- I can use a computer to create a musical pattern using three notes
- I can use a computer to experiment with pitch and duration
- I can refine my musical pattern on a computer

PHOTOGRAPHY

- I can explain the effect that editing can have on an image
- I can change the composition of an image by selecting parts of it
- I can explain what has changed in an edited image
- 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

SOUND

- I can discuss what other people include when recording sound for a podcast
- I can use a device to record audio and play back sound
- 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 use editing tools to arrange sections of audio
- I can explain that digital recordings need to be exported to share them

- 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 copy part of a drawing by duplicating several objects
- I can group to create a single object
- I can suggest improvements to a vector drawing

3D MODELLING

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

VIDEO

- I can explain that a video can include both visual and audio media
- I can plan a video project using a storyboard
- I can identify and name digital devices that can record video and sound
- I can demonstrate suitable methods of using a digital device to capture my video
- I can demonstrate the safe use and handling of devices
- I can explain why lighting and angle are important in creating an effective video
- I can list some of the features of an effective video
- I can record a video that demonstrates some of the features of an effective 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

Data and Information		
KS1	Lower KS2	Upper KS2
<ul style="list-style-type: none"> - I can collect the data I need - I can enter data onto a computer - I can use a computer to view data in a different format - I can organise data in a tally chart - I can use a tally chart to create a pictogram and draw conclusions from it - I can answer 'more than'/'less than' and 'most/least' questions about an attribute - I can give simple examples of why information should not be shared - I can use a computer program to present information in different ways 	<p>DATABASES</p> <ul style="list-style-type: none"> - 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 - I can group objects using my own yes/no questions - I can select objects to arrange in a branching database - I can use my branching database to answer questions - I can compare two branching database structures - I can explain that questions need to be ordered carefully to split objects into similarly sized groups - 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 - 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 <p>DATA LOGGING</p> <ul style="list-style-type: none"> - I can explain that sensors are input devices - I can identify that data from sensors can be recorded - 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 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 	<p>DATABASES</p> <ul style="list-style-type: none"> - 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 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 <p>SPREADSHEETS</p> <ul style="list-style-type: none"> - I can answer questions from an existing data set - 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 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 use a spreadsheet to answer questions" - I can produce a graph - I can explain the benefits of using a computer to create graphs - I can use a graph to show the answer to questions

Programming and Algorithms		
KS1	Lower KS2	Upper KS2
<p>CONTROL</p> <ul style="list-style-type: none"> - 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 choose the order of commands in a sequence - I can debug my program - I can identify several possible solutions - I can add programming blocks based on my algorithm - I can test the programs I have created - I can use sprites which match my design - 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 compare my prediction to the program outcome - I can follow a sequence - I can predict the outcome of a sequence - 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 	<p>SENSORS/CONTROL</p> <ul style="list-style-type: none"> - I can explain that digital devices accept inputs - I can explain that digital devices produce outputs - I can follow a process - I can classify input and output devices - I can design a digital device - I can model a simple process - I can explain how I use digital devices for different activities - I can recognise similarities between using digital devices and non-digital tools <p>ANIMATION</p> <ul style="list-style-type: none"> - I can create an effective flip book-style animation - I can explain how an animation/flip book works - I can create an effective stop frame animation - I can explain why little changes are needed for each frame - I can create a storyboard - I can describe an animation that is achievable on screen - I can evaluate the quality of my animation - I can review a sequence of frames to check my work - I can use onion skinning to help me make small changes between frames - I can explain ways to make my animation better - I can improve my animation based on feedback - I can add other media to my animation 	<p>SENSORS/CONTROL</p> <ul style="list-style-type: none"> - 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 <p>DATA LOGGING</p> <ul style="list-style-type: none"> - 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