Forest Town Primary School

Computing Knowledge Progression Grid

Kind
Adventurous
Persevere
Responsible
Independent
Together

At Forest Town, we are computer scientists! We want our children to use IT confidently, safely and effectively. In addition, we want them to be able to understand computer systems and be able to confidently use software tools to support their learning. They will appreciate the wider impact of technology and learn about how society as a whole interacts with computer systems. We will enable children to create their own software whilst understanding risks and the importance of cyber security and safety. We want to ignite a passion for technology and innovation in children so that they have the fundamental knowledge and skills they need to empower them as competent digital citizens.

At the end of KS2, a Forest Town child will have:

- Become an **independent** learner who uses IT with confidence whilst ensuring their own and others' safety
- Learnt to **persevere** by comprehending, designing, creating and evaluating algorithms. They will create a range of media, make effective use of software tools and be introduced to programming
- Knowledge of safety and security and use **kindness** when considering the impact technology can have on individuals
- A **responsible** attitude towards keeping data and information secure
- Shown that they are **adventurous** by creating a range of media and developing design skills
- Shown **togetherness** by working collaboratively to understand computer networks

COMPUTING

CURRICULUM LEADER

CLARE PURCHASE

REVIEWED – SEPTEMBER 2024

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Reviewed 2024

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This is how our children's SUBJECT knowledge builds from EYFS to Year 6.

In order for pupils to become confident computing experts, we believe a high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world. The 'teach computing' scheme of work supports learning in computing.

Key Stage 1
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
- 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.

Key Stage 2
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 & information
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Computer Science	Information Technology	Digital Literacy
Computer Science 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.	*Information Technology 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 concern about content and contact.*

EYFS	Y1	Y2	Y3	Y4	Y5	Y6
Computer Systems and Networks						
Knowledge: The internet is useful for a variety of different purposes. Dojo connects the grownups to work in school. Adult permission is needed to access technology.	**Technology around us** **Build on prior knowledge and know:** That a computer is an example of technology That technology is something that can help us That choices are made when using technology That rules are needed when using technology and I know why	**IT around us** **Build on prior knowledge and know:** That there are different types of computers used in school That a computer is a part of information technology The features of information technology That the rules for using IT can help us That there are different uses of IT That IT can be beneficial That choices are made when using IT	**Connection Computers** **Build on prior knowledge and know:** What an input is That a process acts on the inputs and produces an output That changing the process can affect the output That a digital device is made up of several parts That computer systems change the way we work That computers can be connected to each other That a network is made up of a number of components The benefits of computer networks	**The internet** **Build on prior knowledge and know:** That networks connect to other networks That information can be shared via the World Wide Web (WWW) That the WWW is part of the internet and that it comprised of websites and web pages That the global interconnection of networks is the internet That there is need for security on the internet The types of content that can be added, created and shared on the WWW The current limitations of the WWW The benefits of the WWW	**Systems and Searching** **Build on prior knowledge and know:** That a system is a set of interconnecting parts which work together That computers can be connected to form IT systems That data can be transferred between IT systems That search engines are examples of large IT systems That search engines create indices, and that they are different for each search engine The role of web crawlers to create an index That search engine results are selected using ranking orders to make them more useful That ranking is determined by rules, and that different search engines use different rules That the order of results is important That search engines make money by selling	**Communication and Collaboration** **Build on prior knowledge and know:** That data is transferred across networks using agreed protocols (methods) That connections between computers allow access to shared stored files That data is transferred in packets That computers connected to the internet allow people in different places to work together That the opportunities that technology offers for communication and collaboration Which types of media can be shared through the internet That communication and collaborating using the internet can be public or private

					targeted advertising space That search engines have limitations	
Skills: How to use age-appropriate apps How to explore an old typewriter.	**Build on prior skills to:** Choose a piece of technology to do a job Recognise that some technology can be used in different ways Identify the main parts of a computer Use a mouse in different ways Use a keyboard to type Use the keyboard to edit text Show how to use technology safely	**Build on prior skills to:** Describe some uses of computer Identify IT in and beyond school Say how to use IT safely	**Build on prior skills to:** Identify input and output devices Explain how a computer network can be used to share information Explain the role of a switch, server, and wireless access point in a network Identify network devices How to identify how devices in a network are connected to one another How information is passed through multiple connections	**Build on prior skills to:** Describe how networks connect to other networks Outline how information can be shared via the WWW. Recognise the need for security on the internet	**Build on prior skills to:** Demonstrate that different search terms produce different results Evaluate the results of search terms Identify some of the limitations of search engines Recognise inputs, processes, and outputs in large IT systems	**Build on prior skills to:** Outline methods of communicating and collaborating using the internet Choose methods of internet communication and collaboration for given purposes Evaluate different methods of online communication and collaboration Decide what you should and should not share online
Creating Media						
Knowledge: That devices can take photos That videos can be watched on a range of devices That music can be listened to on a range of devices That pictures can be created on a range of devices. That iPads can capture video and photographic evidence of learning	**Digital Painting** **Build on prior knowledge and know:** What different freehand tools do That computers can be used to create art That a tool can be adjusted to suit need That I have to consider my choices That my choices have an impact That painting using a computer and painting using brushes can be compared	**Digital Photography** **Build on prior knowledge and know:** That some digital devices can capture images using a camera That photographs can be saved and viewed later That there are choices when composing photography The features of 'good' photographs That a photograph could be improved The effect of light on a photograph That photographs can be changed after they are taken That some images are not accurate	**Stop Frame Animation** **Build on prior knowledge and know:** That an animation is made up of a sequence of images That a capturing device needs to be in a fixed position That smaller movements create smoother animation The need for consistency in working The impact of adding other media to an animation That a project must be exported so it can be shared	**Audio Production** **Build on prior knowledge and know:** That sound can be recorded That an input device is needed to record sound That output devices are needed to play audio That recorded audio can be stored on a computer That audio can be edited That sound can be represented visually as waveform That audio can be layered so that multiple sounds can be played at the same time That editing choices create different results	**Video Production** **Build on prior knowledge and know:** That the features of video as a visual media format Which devices can and can't record video The purposes of a storyboard That filming techniques can be used to create different effects The need to regularly review and reflect on a video project That videos can be edited on a recording device or on a computer The limitations of editing video on a recording device When it is beneficial to reshoot or edit That projects need to be exported to be shared	**Web page creation** **Build on prior knowledge and know:** The relationship between HTML and visual display That web pages contain different media types That web pages are written by people That a website is a set of hyperlinked webpages That a web page layout has components That ownership and use of images has to be considered (copyright) The need to preview pages (different screens/devices) The need for a navigation path The implications of linking content owned by others
Skills: Drawing pictures on the interactive whiteboard Listening to music Taking photos	**Build on prior skills to:** Create a picture using freehand tools Use shapes and line tools when precision is needed Use a range of paint colours Use the fill tool to colour an enclosed area Use the undo button to correct a mistake Combine a range of tools to create a piece of artwork Decide when it is appropriate to use each tool	**Build on prior skills to:** Capture a digital image Take photographs in both landscape and portrait format View photographs on a digital device Decide which photos to keep Hold the camera still to take a clear photograph Use zoom to change the composition of a photo Consider lighting before taking a photo Use filters to edit the appearance of a photo Improve a photo by retaking it	**Build on prior skills to:** Plan an animation using a storyboard Identify that a capturing device needs to be in a fixed position Set up the work area with an awareness of what will be captured Capture an image Use onion skinning tool to review subject position Move a subject between captures Review a captured sequence of frames as an animation Remove frames to improve an animation Add media to enhance an animation Review a completed project	**Build on prior skills to:** Record a sound using a computer Play recorded audio Recognise that sound can be represented visually as a waveform Import audio into a project Delete a section of audio Change the volume of tracks in a project Recognise that audio can be layered so that multiple sounds can be played at the same time Consider the results of editing choices mad	**Build on prior skills to:** Use different camera angles Use pan, tilt and zoom Identify features of a video recording device or application Combine filming techniques for a given purpose Determine what scenes will convey your idea Choose to reshoot a scene or improve later through editing Decide what changes I will make when editing Use split, trim and crop to edit a video	**Build on prior skills to:** Review an existing website (navigation bars, header) Create a new blank web page Add text to a webpage Set the style of text on a web page Change the appearance of text Embed media in a webpage Add web pages to a website Preview a web page (different screen sizes) Insert hyperlinks between pages Insert hyperlinks to another site
Programming						
Knowledge: That Beebots can be programmed. That toys can be programmed using simple coding apps.	**Moving a robot/programming animations** **Build on prior knowledge and know:** That words can be recalled and enacted What a given command means That a command is matched to an outcome That a series of instructions can be issued before they are enacted That a program is a set of commands that a computer can run.	**Robot algorithms & programming quizzes** **Build on prior knowledge and know:** That a series of instructions is a sequence, which can be issued before it is enacted What happens when we change the order of instructions That you can predict the outcome of a program	**Sequencing sounds, events and actions on programs** **Build on prior knowledge and know:** That programs start because of an input What a sequence is That a program includes sequences of commands That the sequence of a program is a process That the order of commands can affect a program's output That different sequences can	**Repetition in shapes & repetition in games** **Build on prior knowledge and know:** What 'repeat' means That some everyday tasks include repetition as part of a sequence That we can use a loop command in a program to repeat instructions That in programming there are indefinite loops and count-controlled loops That an indefinite loop will run until the program is stopped That you can program a loop to stop after a specific number of times	**Selection in physical computing & selection in quizzes** **Build on prior knowledge and know:** That a condition can only be true or false That a count-controlled loop contains a condition That a condition-controlled loop will stop when a condition is met That when a condition is met, a loop will complete a cycle before t stops That selection can be used to branch the flow of a program That a loop can be used to repeatedly check whether a condition has been met	**Variables in games – sensing movement** **Build on prior knowledge and know:** That a 'variable' is something that is changeable That a program variable is a placeholder in memory for a single value That a variable has a name and a value That the value of a variable can be used by a program That the value of a variable can be updated That variables can hold numbers (integers) or letters (strings)

			achieve the same, or a different, output	When to use a loop and when not to The importance of order in a loop That not all tools enable more than one process to be run at once	The importance of instruction order in "if…the…else" statements	That a variable can be set as a constant (fixed value) The importance of setting up a variable at the start of a program (initialisation) That there is only one value for a variable at any one time That if you change the value of a variable, you cannot access the previous value (cannot undo) That the name of a variable is meaningless to a computer That the name of a variable needs to be unique
Skills: To explore Beebots To play games on the interactive whiteboard To play with table apps	**Build on prior skills to:** Enact a given word Predict the outcome of a command on a device List which commands can be used on a given device Run a command on a floor robot Choose a command for a given purpose Choose a series of words that can be enacted as program Choose a series of commands that can be run as a program Build a sequence of commands in steps Combine commands in a program Run a program on a device	**Build on prior skills to:** Choose a series of words that can be enacted as a sequence Choose a series of instructions that can be run as a program Trace a sequence to make a prediction Create a program Run a program on a device Debug a program that I have written	**Build on prior skills to:** Build a sequence of commands Combine commands in a program Order commands in a program Create a sequence of commands to produce a given outcome	**Build on prior skills to:** List an everyday task as a set of instructions including repetition Identify patterns in a sequence Identify a loop within a sequence Use an indefinite loop to produce a given outcome Use a count-controlled loop to produce a given outcome Plan a program that includes appropriate loops to produce a given outcome Recognise tools that enable more than one process to be run at the same time (concurrency) Create two or more sequences that run at the same time	**Build on prior skills to:** Create a condition-controlled loop Use a condition in an 'if…then…' statement to start an action Use selection to switch the program flow in one of two ways Use a condition in an 'if…then…else…' statement to produce given outcomes	**Build on prior skills to:** Identify a variable in an existing program Experiment with the value of an existing variable Choose a name that identifies the role of a variable to make it easier for humans to understand it Decide where in a program to set a variable Update a variable with a user input Use an event in a program to update a variable Use a variable in a conditional statement to control the flow of a program Use the same variable in more than one location in a program
Data and information						
Knowledge: That an adult should supervise when using the internet Never to share information when accessing technology unless a safe adult has helped me, i.e. giving a date of birth to create an account on an age-appropriate app	**Grouping Data** **Build on prior knowledge and know:** That objects can be counted That information can be presented That information can be presented in different ways	**Pictograms** **Build on prior knowledge and know:** That a tally chart can collect data That a tally chart and pictogram need appropriate headings That objects that have been grouped by attribute and to construct can be compared using a given comparison question, e.g. *Are there more X balls that Y balls?* That we can present information using a computer That a computer program can present information in different ways That some information should not be shared	**Branching Databases** **Build on prior knowledge and know:** That you can identify attributes using yes/no questions That you must select an attribute to separate objects into two similarly sized groups That a branching database is an identification tool That a data set can be structured using yes/no questions That a well-structured branching database will enable you to identify objects using fewer questions That real-world applications for branching databases are widely used.	**Data Logging** **Build on prior knowledge and know:** That questions that can be answered using a table of data That data can be logged over time That sensors are input devices That a sensor can be used as an input device for data collection That a data logger captures 'data points' from sensors over time	**Flat file databases** **Build on prior knowledge and know:** That a computer program can be used to organise data That tools can be used to select data to answer questions That operands can be used to filter data That ordering data allows us to answer some questions That 'AND' and 'OR' can be used to refine data selection That computer programs can be used to compare data visually That we present information to communicate a message	**Introduction to spreadsheets** **Build on prior knowledge and know:** That questions that can be answered using spreadsheet data What an item of data is in a spreadsheet That the data type determines how a spreadsheet can process the data That there are different software tools to work with data That formulas can be used to produce calculated data That cells can be liked How and why data should be organised in a spreadsheet That a cell's value automatically updates when the value in a linked cell is changed That results can be evaluated in comparison to the question asked
Skills: Retrieve basic information from the internet Use a search engine	**Build on prior skills to:** Identify some attributes of an object Collect simple data Show that collected data can be counted Describe the properties of an object Choose an attribute to group objects by Group objects to answer questions	**Build on prior skills to:** Show I can enter data onto a computer Recognise that people, animals and objects can be described by attributes Use a computer to view data in different formats Use pictograms to answer single-attribute questions Use a computer to answer comparison questions (graphs, tables)	**Build on prior skills to:** Create questions with yes/no answers Choose questions that will divide objects into evenly sized subgroups Repeatedly create subgroups of objects Identify an object using a branching database Retrieve information from different levels of the branching database Investigate questions with yes/no answers	**Build on prior skills to:** Use a digital device to collect data automatically Choose how often to automatically collect data samples Use a set of logged data to find information Use a computer program to sort data by one attribute Export information in different formats	**Build on prior skills to:** Choose different ways to view date Choose which attribute and value to search by to answer a given question (operands) Ask questions that need more than one attribute to answer Choose which attribute to sort by to answer a given question Choose multiple criteria to search data to answer a given question (AND OR) Select an appropriate graph to visually compare data Choose suitable ways to present information to other people	**Build on prior skills to:** Calculate data using a formula for each operation Use functions to create new data Use existing cells within a formula Choose suitable ways to present spreadsheet data
Creating Media						

Knowledge: To know that a keyboard will enter text on a computer	**Digital Writing** **Build on prior knowledge and know:** That a keyboard is used to enter text into a computer That the shift key changes the output of a key That text can be changed and edited That the appearance of text can be changed That choices made have an impact	**Digital Music** **Build on prior knowledge and know:** That computers can be used to play sounds of different instruments That the same pattern can be represented in different ways That playing music on instruments can be compared with making music on a computer	**Desktop publishing (DTP)** **Build on prior knowledge and know:** That text and images can be used together to convey information That portrait and landscape are two different page orientations That different layouts can suit different purposes That DTP pages can be structured with placeholders That different font styles and effects are used for particular purposes The benefits of using a DTP application	**Photo Editing** **Build on prior knowledge and know:** That an application can change the whole of a digital image by rotating and flipping, cropping, adjusting colour, applying a filter or effect That an application can change part of a digital image by selecting part of the image and applying an effect; using clone, copy and paste to change the composition, using cloning to retouch a digital image That an application can add to the composition of a digital image by adding text to the image	**Introduction to vector graphics** **Build on prior knowledge and know:** That a vector drawing comprises separate objects That each object in a drawing is in its own layer That vector images can be scaled without impact on quality That objects can be modified in groups That alignment and size guides can help create a more consistent drawing That choices have an impact	**3D Modelling** **Build on prior knowledge and know:** That 3D models can be created on a computer That a 3D environment can be viewed from different perspectives That digital tools can be used to manipulate 3D objects That placeholders can create holes in 3D objects That artefacts can be broken into a collection of 3D objects
Skills: To explore playing with keyboards and recording information	**Build on prior skills to:** Use letter, number and Space keys to enter text into a computer Use punctuation and special characters Select text Use the backspace key to remove text Position the text cursor in a chosen location Choose options to achieve a desired effect Change the appearance of text on a computer Use undo	**Build on prior skills to:** Experiment with musical patterns on a computer Use a computer to compose a rhythm and a melody on a given theme Use a computer to play the same music in different ways (e.g. tempo) Evaluate a musical composition created on a computer Improve a musical composition created on a compute	**Build on prior skills to:** Show that page orientation can be changed Add text to a placeholder Organise text and image placeholders in a page layout Add and remove images to and from placeholders Edit text in a placeholder Move, resize and rotate images Choose fonts and apply effects to text Review a document	**Build on prior skills to:** Recognise that digital images can be manipulated Recognise that digital images can be changed for different purposes To choose the most appropriate tool for a particular purpose Consider the impact of changes made on the quality of the image	**Build on prior skills to:** Add an object to a vector drawing Select one or multiple objects Delete objects Move objects between the layers of a drawing Duplicate objects using copy and paste Modify objects Reposition objects Group and ungroup selected objects Combine options to achieve a desired effect Create a vector drawing for a given purpose	**Build on prior skills to:** Position 3D shapes relative to one another Use digital tools to modify 3D objects Combine objects to create a 3D digital artefact Use digital tools to accurately size 3D objects Construct a 3D model which reflects a real world object