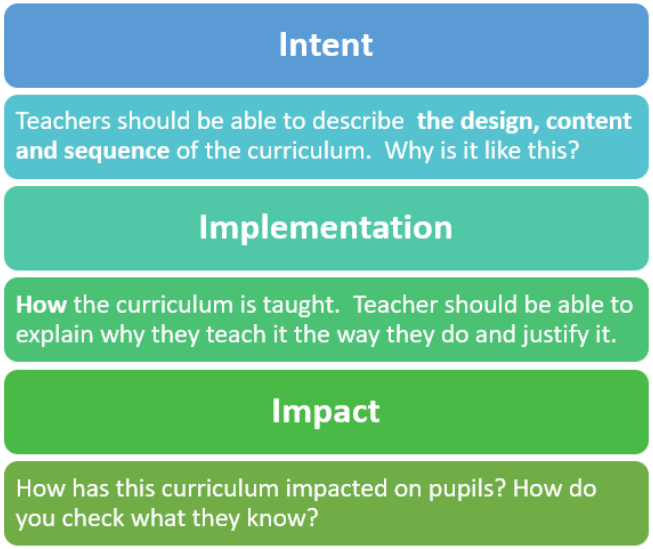
Entrust Education Technologies – Computing Progression Framework

Introduction to the scheme of work

This scheme of work for computing will help you deliver a progressive, spiral curriculum for the teaching of computing.

Ofsted says "*The curriculum is a framework for setting out the aims of a programme of education, including the knowledge and understanding to be gained at each stage **(intent)**; for translating that framework over time into a structure and narrative, within an institutional context **(implementation)** and for evaluating what knowledge and understanding pupils have gained against expectations **(impact/achievement)**.*"



The computing skills within this scheme equips pupils to use computational thinking and creativity to understand the principles of information and computation, how digital systems work and programming.

The scheme of work is well planned and sequenced through a spiral curriculum that builds upon what has gone before and prepares pupils for what comes next. The units from year to year have been sequenced to include the consolidation and extension of skills and knowledge. Key learning outcomes are identified for each unit to explain what pupils need to know about the current topic to ensure that they are prepared to understand and succeed in the next topic. We have suggested themes/content to use to deliver the programmes of study e.g. rainforests in Year 4, but you are free to adopt and adapt some, or all of the units, to fit in with your school topics and needs of learners.

Waypoints have been set out as learning outcomes for each lesson and identified on the planning documents as pupil outcomes. These show what pupils need to know, or should be able to demonstrate, as a skill by the end of each lesson in order to understand and succeed in subsequent lessons and to progress on to the next phase of learning when the topic is revisited at a later stage. They will also help the teacher check pupils' understanding through formative assessment to inform teaching and make necessary adjustments to planning if objectives have not been met or to identify and correct misunderstanding. These outcomes will also support pupils to embed knowledge and support teachers in feedback to move learning forward and produce clear next steps for pupils.

Knowledge organisers are used to remind pupils of key vocabulary and learning points from previous associated units taught as a starting point for class discussion and to point out where knowledge is already secure, where misconceptions lie and where knowledge is lacking. They are also helpful to introduce pupils to new vocabulary and learning points for the new unit and can be used by pupils to reflect on their own learning through self-assessment. Knowledge organisers also help the teacher have a view of how pupils are progressing through the curriculum. From year to year, key skills are revisited and built upon to ensure consolidation and progression. Reference is also made to the world of work and highlights the types of jobs/roles that use the skills being taught to give the learning a real-world context and purpose.

Expected **end points** for the end of KS1, end of LKS2 and end of UKS2 have been identified to determine the key milestones in terms of skill progression upon which summative assessment should focus.

If you are new to this scheme of work we have suggested a gradual year on year delivery model to ensure successful delivery of the units and to ensure that all learners start from an appropriate point based on prior knowledge and experience whilst still progressing on through the key learning.

Within the scheme, under the term ‘information technology’ we refer to data handling, databases and spreadsheets, collecting, evaluating and presenting information. Computer Science and Programming features as a separate aspect to information technology. It should be noted that the statutory requirements are not labelled under these headings in the programme of study, and the distinction between information technology and digital literacy is open to some interpretation. The scheme aims to cover the content in a balanced, stimulating and creative way rather than being overly concerned about the specifics of terminology. For the Digital Literacy coverage we recommend using Education for a Connected World framework alongside the Project Evolve Toolkit as Digital Literacy requirements will differ from school to school dependant on need of learners and should be incorporated into your Relationships and Health Education curriculum.

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	Key Stage 1	Key Stage 2
Computer Science and Programming	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	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 Appreciate how [search] results are selected and ranked
Information Technology - Data Handling, Databases and Spreadsheets	Use technology purposefully to create, organise, store, manipulate and retrieve digital content	Use search technologies effectively 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
Information Technology - Collecting, Evaluating and Presenting Information	Use technology purposefully to create, organise, store, manipulate and retrieve digital content	Use search technologies effectively 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
Digital Literacy – Education for a Connected World framework and Project Evolve Toolkit	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	Understand the opportunities [networks] offer for communication and collaboration Be discerning in evaluating digital content Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact

Desirable functional skills

These skills should be taught and used by children from the outset. Some of these skills have been outlined as an explicit part of a lesson whilst others are incidental and must be learnt for children to complete computing tasks effectively and independently.

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Desirable Functional IT Skills	
Key stage 1	**Key Stage 2**
• Logging on/off to a device • Logging on/off software/app accounts • Opening/closing programs/tabs/apps • How to start a new file • How to open a previously saved file • How to open a shared file • Mouse control hand eye co-ordination • Mouse clicks left/right button left click, single click to select, click and drag, double click to launch • Touchscreen skills e.g. hold a picture to save, swipe, single and double tap • Keyboard skills for capital letters and simple punctuation. Keyboard layout: letters, numbers, backspace, delete and return/enter key • Accessing/hiding onscreen keyboards • Take photographs on digital devices and upload • How to add text • How to add an image • How to add a sound	• Cut/copy and paste with a mouse • Keyboard short cuts ctrl+V, ctrl+C and ctrl+X • Touchscreen skills e.g. hold a picture to save, swipe, single and double tap • Mouse right click to access additional functions • Typing Skills - two hands, multiple fingers, use of both shift keys • Viewing open windows: minimise, maximise, close, dual screen view and navigate between multiple tabs, windows and applications • Make folders for file management, add and move files, copy and rename files to add to folders • Understand the difference between Save, AutoSave and Save As • Add attachments and send to others • Share files with others for accessing, collaborating and marking • Know how to collaborate on a document online e.g. wiki • Know how to communicate online e.g. email, online forums, message boards, direct messaging, video calling and social media • Understand how to use privacy tools when communicating online • Upload files from external device • Understanding where work is saved e.g. hard drive/cloud/shared network • Use search to locate and open files • Take, save and use screenshots • Highlighting copy/cut and paste, alignment and Tab key • Print work • Use advanced search engine tools to find web sites and images e.g. searching for copyright free content or transparent images and cite references • Highlighting and formatting text and images

Expected end points

Information Technology - Handling data, databases and spreadsheets

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By the end of KS1	By the end of LKS2	By the end of UKS2
• Ask questions and collect data for a specific purpose. • Construct simple tally charts, tables, charts and pictograms. • Ask and answer simple questions from data displayed in simple tally charts, tables, charts and pictograms about totalling and comparing data.	• Ask questions to organise and sort data into groups or to classify things. • Gather, record and present data in a simple database to help in answering questions. • Use sort and search techniques to locate data in a simple database based on specific criteria. • Interpret and present discrete and continuous data in charts and graphs.	• Complete, read and interpret information in spreadsheets. • Use data presented in spreadsheets through constructing formulae to solve problems or model outcomes to ask and explore 'what if' questions. • Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs.

Expected end points

Information Technology – Collecting, evaluating and presenting information

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By the end of KS1	By the end of LKS2	By the end of UKS2
• Create a range of digital content using software under the control of the teacher that includes word processing, creating pictures using a paint package, taking and manipulating digital photographs and video, including animation. • Store, organise and retrieve digital content – save a file, know where the file is saved and open it, organise files in a workspace. • Combine content from different sources (word processing, paint, photos/video/animation and charts) to create a digital portfolio (J2Mix) • Recognise common uses of technology beyond school.	• Create a range of digital content using software with increasing independence that includes word processing, creating pictures using a paint package, animation, multimedia including sound, video and hyperlinks to present content. • Store, organise and retrieve digital content – save a file, know where the file is saved and open it, organise files in a workspace.	• Create a range of digital content using software with increasing independence that includes word processing, animation, multimedia including sound, video and hyperlinks to present content. • Show an awareness of audience and purpose when presenting content through careful choice of layout, colours, images, sound and overall content to convey appropriate meanings and styles. • Use a range of digital technologies to communicate and collaborate with one another in real time, understanding that different technologies work with different-sized groups and know when one method is more appropriate to use compared to another. • Are aware that terms and conditions of services do apply to them and recognise acceptable and unacceptable behaviour. • Show an awareness of being discerning in evaluating digital content. • Show an awareness of their own digital footprint and how data is collected and used by companies online. • Show an awareness of the implications and capabilities of artificial intelligence and machine learning technology. • Know how Big Data, the Internet of Things and Artificial Intelligence technologies gather data from connected devices. This data is used by businesses within their key processes and daily tasks, assisting new developments in technology moving towards a ‘smart’ and more efficient society.

Expected end points

Programming and Computer Science

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By the end of KS1	By the end of LKS2	By the end of UKS2
• Use logical reasoning to predict the behaviour of simple programs using route-based programming. • Know what an algorithm is. • Write and debug simple programs showing an understanding of sequencing, with help from the teacher, using simple movements for a floor turtle and an onscreen turtle/sprite.	• Begin to use logical reasoning to explain how simple algorithms and programs work. • Independently detect errors in algorithms and programs using block-based programming and correct errors with support. • Know the difference between an algorithm and a program. • Write new or modify algorithms and programs with increasing independence, showing an awareness of sequencing, inputs, outputs, and repetition. • Identify patterns in instructions to begin using repetition for count controlled loops and indefinite loops including nested loops. • Begin to use selection 'if…then' and repetition using condition loops. • Begin to show an awareness of how data is stored in a computer's memory as a bit using either a 1 or 0 symbol. • Know how RAM is used by the CPU to process data. • Know that 8 bits makes a byte and decode bytes using ASCII Code. • Create binary images.	• Use logical reasoning to explain how simple algorithms and programs work. • Independently detect and correct errors in algorithms and programs using block-based programming. • Use decomposition to solve complex problems. • Know that there is more than one way to solve a problem through programming and effectively select the most efficient method. • Use sequence, repetition, and selection with increasing confidence. Developing selection from 'if…then' to 'if…then…else' and integrate into loops and nested loops where appropriate. • Understand and use variables in code. Know when to use a placeholder variable or a variable to store and change numbers in code. • Understand what the internet is, how it provides a variety of services to networked computers and how data travels as packets from one computer to another. • Show an awareness of how search engines work in relation to page ranking and algorithms. • Be discerning in evaluating digital content with an awareness of fake news.

Key Stage 1		Key Stage 2			
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Gathering data and creating charts Create charts using JIT 'Chart' and 'Pictogram' tools. Develop an understanding of interpreting data from a chart using JIT 'Mix' to present work.	**Collecting, organising, and presenting data** Develop a better understanding of interpreting data from a chart – using JIT 'Chart' and 'Pictogram' tools. Gather opinions using the j2vote software and present the findings.	**Creating a branching database and interrogating simple databases** Understand what a database is and how frequently we use them in life. Use JiT Branch to create and use a branching database, focusing on questions to ask to uniquely identify objects/people. Use j2Data to interrogate a simple database. Create a j2e5 file to evidence screen captures of the searches and to reflect on learning.	**Creating and interrogating simple databases** Discuss how information is collected and organised for use in a database. Design a database, considering audience and purpose. Interrogate data contained within a database using the sort and search functions.	**Creating and using spreadsheets as models to solve problems** Use and create spreadsheets to support solving mathematical problems, use simple formulae to carry out calculations and answering what if type questions. Present information in the form of graphs where required.	**Analyse and interpret data using spreadsheets** Create spreadsheets that are fit for purpose and support the user in finding the answers to problems by modelling real life situations. Consider layout options to improve the user experience and create complex formula, that uses brackets, to carry out two step calculations.

Information Technology Progression for Data Handling, Databases and Spreadsheets

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Key Skills

Key Stage 1		Key Stage 2			
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Gathering data and creating charts Know what the term data means and how we can collect data and present it in the form of a tally chart and pictogram Collect data to create a tally chart. Use the chart to create a pictogram and explain what the pictogram shows by interpreting the data Gather data and present as a pictogram. Know that data can be represented in other ways than using a tally chart or pictogram. Use the pictogram to create a block chart	**Collecting, organising and presenting data** Know what a multiple-choice question is and why they are a good way of collecting data from lots of people. Answer multiple-choice questions for the purpose of collecting data Know that there are other ways to gather data by asking questions that are not multiple-choice by using yes/no questions. Design multiple-choice questions and yes/no questions to gather data To create charts from information in tally tables and interpret the data from the chart Know what characteristics are and how to use them to sort groups of objects by using yes/no questions. Use a branching database to answer questions Mistakes can be made when collecting and organising data. If the	**Creating a branching database and interrogating simple databases** Know what characteristics are and how to use them to sort groups of objects by using yes/no questions. Use a branching database to answer questions Know that yes/no questions need to be ordered carefully when grouping objects to create the structure for a branching database Know the term 'database' and how they are used to store and organise data using key characteristics Use tools within a database to order and answer questions about the data using simple searches Develop search techniques to match data from more than one field using 'AND' and 'OR' to refine results	**Creating and interrogating simple databases** To locate data organised in a paper-based record card database, identifying fields and data to answer specific questions Design a questionnaire using a range of data types and open and closed questions to gather useful data that is fit for purpose to solve a given problem Use an electronic database to look at how data can be recorded. Enter data to create records under appropriate field names Use an electronic database to examine how data can be viewed, sorted and searched for Create and use charts to visually compare data and answer questions about it	**Creating and using spreadsheets as models to solve problems** Organise data into columns and rows to create own data sets and apply formulae using cell references that include a range of cells to calculate data Use a spreadsheet to answer questions and identify that changing inputs will change the output of a calculation where formula is used Create a spreadsheet by organising data into columns and rows using appropriate headings and create simple formulae using the four basic maths operations (+, -, x and ÷) using cell references where appropriate to calculate the data to model and answer questions Create a spreadsheet by organising data into columns and rows using appropriate headings and create formulae, including	**Analyse and interpret data using spreadsheets** Create formulae using cell references, including a range of cells to produce calculated data Create formulae using the four basic maths functions (+, -, x, ÷) and cell addresses where appropriate, using brackets to order mathematical operations Apply appropriate number and text formats to cells. Remove and add data to a spreadsheet and adjust formulae where required. Use the spreadsheet model to answer questions that model real-life events Create a spreadsheet by organising data into columns and rows using appropriate headings and create simple formulae using the four basic maths operations (+, -, x and ÷) using cell references where appropriate to calculate the data to

	mistakes are not found it makes the data unreliable	Know that a database may contain errors and can affect search results		minimum, maximum and average, using cell references to calculate the data Design a spreadsheet to model a real-life problem using appropriate formulae using cell references to calculate data. Create graphs to display data to evaluate results in comparison to the problem being modelled	model and answer questions Add data to a pre-populated spreadsheet and use formulae, using cell addresses and cell ranges where appropriate to model real-life scenarios and answer questions

Information Technology Progression for Data Handling, Databases and Spreadsheets

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Pupil Outcomes

Key Stage 1		Key Stage 2			
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Gathering data and creating charts I can create a tally chart I can analyse data from a tally chart I can add data to a pictogram using data from a tally chart I can analyse data from a pictogram I can add data to a bar chart using data from a pictogram I understand about the x and y axis and how this relates to my data I can analyse data from a simple bar chart	**Collecting, organising, and presenting data** I can create questions with appropriate multiple-choice answers I can interpret data from a chart I can design a data collection sheet I can use a branching database to sort and organise data	**Creating a branching database and interrogating simple databases** I can create a branching database I can use a branching database to identify data I understand what a field and record is in a database I can sort information in a database into order I can use a simple search to find information on one field in a database I can use a complex search to find information from more than one field in a database by using AND OR I can find errors in a database I know why it is important to enter data into a database accurately	**Creating and interrogating simple databases** I understand the differences between a paper based and electronic database I understand why using a closed ended question is better for data collection I understand why it's important for answers in a database to use the same units and data types I know what the difference is between information and data I can create appropriate questions to gather useful data that is fit for purpose I can enter data accurately into a database record I understand the relationship between a record and a field in a database	**Creating and using spreadsheets as models to solve problems** I know what a cell reference/cell address is I know how to generate lists of numbers using the autofill tool I can create simple formulae to perform calculations in a spreadsheet I can make my formulae more efficient through using the inbuilt formulae functions and cell references I can use column labels appropriately in a spreadsheet I can explain how formulae work in a spreadsheet I can use a spreadsheet to help solve problems I can use the editing tools to improve the	**Analyse and interpret data using spreadsheets** I can create simple formulae to perform calculations in a spreadsheet I can create formulae to find the min and max scores in a game I understand the importance of expressing formulae correctly I can create formulae to carry out each one of the four basic mathematical functions I understand which variables to change and can predict what the effect of changing the variable will be to answer, 'what if?' questions I can use the editing tools to improve the legibility of a spreadsheet table and display decimal places

			I can sort and search through information using more than one criterion, to answer specific questions I can produce charts to compare and interpret data	legibility of a spreadsheet table and display decimal places I can present and interpret information in a graph	I can design and create a functional spreadsheet that includes working formulae, to answer a real-life problem I can abstract information fit for purpose and use it in a spreadsheet to model answers to the problems

Information Technology Progression for Collecting, Evaluating and Presenting Information

Unit Overviews

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Key Stage 1		Key Stage 2			
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Just Paint and Write – Part 1 - All about Me Children will create a number of drawings and text files, save them and then use them in a JiT5 'Write' and 'Paint' software to produce pieces of work entitled' All about Me'	**Ways to Present Information** Design assets using JiT5 'Paint', 'Write' and 'Animate' tools	**Organising, Creating and Presenting** Use 3 types of multi-media: text, image and animation to create, organise and present content effectively, considering layout choices and appropriate presentation styles depending on purpose	**Multimedia Fact File** Create a researched based fact file based upon a topic being studied (Rainforest). Plan and create fact files pages that are hyperlinked from the home page include a range of multimedia – images, sounds, images and video	**Infographics** Develop an understanding of what makes infographics a popular choice to present and share information. Develop an understanding of colour, styling, enhanced editing tools and the use of charts/graphs/tables to effectively present information. They will research and select key information to present as an infographic in J2e5	**Understanding Big Data** This unit will look at what big data is, the impact on privacy and security of data, how data is used by others in both authorised and unauthorised ways
Collect Photographs and Paint Pictures – Part 2 Create digital album using Photographs, JIT5 'Write, 'Paint' and 'Mix' tools	**Art of Animation** Design animations that present information about oceans. Each lesson assets will be drawn using JIT5 'Paint' as well as adding backgrounds and shared images to combine and create an effective animation	**QR Codes** Explore what QR codes are and how they are created to present information to a user. Children will record sound files and create QR codes to allow others to access and listen to the sound file			**Artificial Intelligence and Machine Learning** Explore real world applications that use Artificial Intelligence (AI) and Machine Learning (ML) and reflect on its potential for the future of different industries and job roles that may not yet exist. Students will learn how to create their own Smart Classroom
	Create a Topic-Based eBook Use JiT tools to create an eBook in Jit Mix tool – include a mixture of text, painting and photos within a variety of page layouts				

Information Technology Progression for Collecting, Evaluating and Presenting Information

Key Skills

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Key Stage 1		Key Stage 2			
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Just Paint and Write – Part 1 - All about Me Use a range of tools within paint - change the brush size, colour, and texture to draw pictures. Know how to clear a mistake. Save as a paint file, an image, and stamp Become familiar with typing on a keyboard and begin to use simple tools to change the appearance of the text. Upload an image as a background Independently use paint tools, including adding relevant stamps, to build up a picture Know how to add a text stamp and customise the text before adding to the paint file With increasing independence, type on the keyboard and begin to use simple tools to change the appearance of the text. Upload an image as a background	**Ways to Present Information** Search for appropriate images online and use paint tools to create additional features to design a digital picture that tells/explains a specific story or process Use digital pictures created as backgrounds for writing. Use the mouse cursor to select text then use text editing tools to change the appearance of the text Know that animation is another method to present information. Create multiple frames that contain images with each image being slightly different from the previous one	**Organising, Creating and Presenting** Know how to add text, borders, and images, making appropriate choices regarding position, size, colour and theme Know how to present work clearly and for appeal/interest. Use tools to layer and arrange images and text that can be clearly read/seen Take photographs and mask the background to make the image transparent. Upload and layer onto other images Create an animation using onion skinning technique and save as a GIF. Embed the GIF into another document	**Multimedia Fact File** Know how to present information on a page using text and images. Plan a non-linear presentation, making appropriate choices for layout and content to present the information clearly. Be aware of copyright issues surrounding the use of images online Know and use different ways of presenting information to make the content more engaging and accessible through the use of sound files and embedded videos Create multiple pages for their presentation and use hyperlinks to link them together as detailed in their planning to create a non-linear presentation	**Infographics** Know that an infographic is a creative way of presenting key information through text, images, tables, charts, and graphs Know how colour can be used to enhance ways of presenting information, making careful choices regarding legibility and the intended effect on mood and associations Make choices about the style of text and images to use. Understand about copyright issues on images and abide by licences Organise and present information in the style of an infographic	**Understanding Big Data** Understand how our data can be actively and passively collected, stored, and used by others when we connect to the Internet Know that data can't be collected by companies without prior consent from the user. Understand the importance of terms and conditions and a user's 'choice' to allow data to be collected, stored, and shared Know how data can be accessed and used without user consent or knowledge through hacking. Understand that hacking is a criminal offence and ethical hacking is not Know that a cookie is used by websites to remember you, your preferences, and your habits online

Collect Photographs and Paint Pictures – Pt 2 With increasing independence, type on the keyboard and begin to use simple tools to change the appearance of the text. Upload an image as a background Know what makes a good photograph composition and how to use a digital camera to take a photograph. Compose and capture own photographs Independently use a range of tools within paint – change the brush size, colour and texture to draw pictures. Know how to clear a mistake Know that photographs can be changed after taking them using image editing tools to change the colour effect and overall appearance of an image Create a compilation of work and explain the tools used to create each piece of work	**Art of Animation** Upload an image from shared files to a paint file and use the fill tool to add colour to certain areas of the image. Save as a paint file and as an image Upload image saved to animate, duplicate frames and add ABC.. stamps to particular frames, using them as labels to identify the continents and oceans, making sure that the frames last long enough for the information to be read before moving on to the next labelled frame Create a paint project and use a variety of tools to create a scene and save as a paint file and an image Create individual paint projects and use a variety of tools to create objects related to the scene and save each one as a paint file and a stamp Create an animation using onion skinning as the technique when working on the next frame to show movement. Upload the image of the scene as a background, stamps created in Paint and stamps saved in shared files to tell a story	**QR Codes** Create QR codes using a QR code generator. Understand how the QR code links to the location of where the information is stored Scan QR Codes to access information easily. Understand that each QR code is unique and can only link to one location/information source Record an audio file and create a QR code to share its location with others Create QR codes that link to different media e.g. websites, audio files, notes to provide easily accessible information			**Artificial Intelligence and Machine Learning** Know how to be discerning in evaluating digital content showing an awareness of misinformation and disinformation Know how artificial intelligence and machine learning works using big data to learn from Understand artificial intelligence and machine learning and how it benefits others Using IBM Watson train a Smart Assistant to switch devices on/off e.g. a lamp and a fan using AI and ML

	Create a Topic-Based eBook Make appropriate choices on the layout and presentation of a title page. Include an image – either digital photo or a drawing and add text Use digital pictures as backgrounds for writing. Use the mouse cursor to select text then use text editing tools to change the appearance of the text Use paint and write programs to design and create content, making use of the various tools to produce paint files, stamps and write files. Combine work in a digital portfolio				

Information Technology Progression for Collecting, Evaluating and Presenting Information

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Pupil Outcomes

Key Stage 1		Key Stage 2			
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Just Paint and Write – Part 1 - All about Me I can login to J2e/Entrust Launch with my own username and password I can create a JiT5 'Paint' page I can use the drawing tools to resize my paint brush, use the fill tool and use the textures tool I can name and save my work. I can retrieve my work from My Files, edit it and save it again I can save my drawing as both a Paint file and an image file I can add a background image to my JiT5 'Write' page and add some text I can use JiT5 'Paint' tools to create drawings and save as a paint file, an image and a stamp I can use stamps to create a picture I can add text to a speech bubble stamp	**Ways to Present Information** I can create a painting using JiT5 'Paint' I can search for online pictures in Paint I can create several paintings and save them as pictures to use later I can use my paintings as backgrounds for my writing I can create JiT5 'animate' on my own I can name and save my work	**Organising, Creating and Presenting** I can add and edit text to improve its presentation I think carefully about the way my work is presented on screen and can adjust its position on the page I can begin to make decisions over colour schemes when presenting my work I can search and upload an image into my work I can use tools to create a digital worksheet that includes objects that are locked or free to move around the page I can discuss presentation techniques when looking at examples I can select appropriate images for the work I am creating I understand and can move objects between layers on the page	**Multimedia Fact File** I know what multimedia is and I know that it makes presentations more engaging I know the difference between linear and non-linear presentations I can use effective editing tools to present my text clearly I can rearrange layers on my page to improve the design I know that digital images come in different file types - PNG JPEG I can compare two presentation pages and say why one is better than the other I can group objects on a page 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	**Infographics** I can explain what an infographic is I understand why infographics are used by businesses I know that infographics are easy to find in a web search because of the way the search engine algorithm works e.g. favouring content shared on social media I can make judgements on the design of an infographic to evaluate its effectiveness I understand that colour can impact the design of an infographic due to meanings and associations as well as colour combinations I know what colours work well together and which colours to avoid using I know that text styles are chosen for their effect and intended use when presenting information	**Understanding Big Data** I understand what big data means I can explain what digital footprint means I can evaluate my own digital footprint I can explain why understanding terms and conditions for online platforms is important I can give examples of some of the rights companies have when you agree to their terms and conditions I know what an ethical hacker is and what they do I can explain why a hacker might want to steal data I can explain what I need to do to reduce the risk of being hacked I understand what website cookies are I know why someone would or would not want cookies enabled on their computer

I can add a photograph and write some sentences about myself using JiT5 'Write' software		I can add an image as a background and change its transparency to improve the presentation of my work I can search for appropriate images using Google I can save an image from Google I can upload an image to J2e I can take an image using a camera I can remove the background of an image I can layer images together to create one image I can retrieve previously saved files and continue working with them I understand about the onion skinning technique and how it is used in stop motion animation I can create a simple stop motion animation I know what a GIF is I can upload a GIF I have created into another work file	I can record my narration as a sound file and add it to an image or text box in J2e5 and add text to the image I can embed a YouTube video in my presentation I can add links (hyperlinks) to websites, and links to other pages within my presentation	I know that carefully selecting images to convey the right message is important I understand that I should abide by copyright licences if I am to use someone else's image in my own work I understand how to carry out an image search more effectively by using the appropriate search tools I can use charts and graphs appropriately to display data I can choose colour combinations for effect, either for contrast or harmonising to create an eye-friendly yet eye-catching infographic I understand that images and colours can impact on how a person may feel and I can justify my reasons for the colour scheme and images I have chosen I have considered the overall design and limited my use of colour and images so as not to distract from the intention of the infographic	I can explain the pros and cons of accepting cookies

				I have used a variety of presentation skills such as layering, transparent images, coloured text, filled text boxes and background fills to design my infographic I have carefully chosen interesting and related facts and stats to convey the intended message for my infographic	
Collect Photographs and Paint Pictures Part 2 I can add a photograph that has been shared with me and add it to a JIT5 'Write' file I can add text to a JIT5 'Write' file I can name and save my work I can take photographs and upload them to 'My Files'. I can add my photographs to a JIT5 'Write' page and add a sentence to explain the picture. I know how to avoid overwriting my work, by naming and saving my work, closing the programme and	**Art of Animation** I can name and save my work as a JiT Paint file, an image and a stamp. I know that a frame is an individual picture and when frames are shown in a sequence create an illusion of movement to make an animation I can create several paintings and save them as pictures to use later. I can use the textures and colour wheel to add extra detail to my pictures I can make use of the 'onion skin' effect to add movement to my JiT animation. I know the difference between the duplicate +	**QR Codes** I know what a QR code is I can recognise a QR code I know that a QR code stores data that is machine readable that directs a user to the information I know how to create a QR code online I can scan a QR code and access the information that it links to I can search for appropriate images using Google I can save an image from Google I can upload an image to J2e			**Artificial Intelligence and Machine Learning** I know what misinformation and disinformation means I know that there are two types of fake news and can explain what they are I understand how machine learning and artificial intelligence is being used I can explain what machine learning and artificial intelligence is and how it uses big data I can explain how artificial intelligence and machine learning uses big data to benefit others I can create a Smart Classroom using IBM Watson and machine learning

reopening the programme. I can give responsible and respectful feedback to a partner. I can paint pictures using an app on my device and save it to 'My Files' in J2e I can edit photographs in J2e with the camera app and save them in 'My Files' and use them in JIT I can create a JIT5 'Mix' to showcase my work I can add 3 or 4 pages to my JIT5 'Mix'	frame and + add frame when using JiT animate. I can add background images and stamps to my presentation. I can create a JiT Paint file and add text to it.	I can add text boxes, shapes and images to a J2e5 file I can use layers in J2e5 I can record sound in J2e5 I can rename a sound file in J2e5 I can create a QR code that links to my sound recording in J2e I can add a QR code to my J2e5 file and print it			I can understand the implications and capabilities of artificial intelligence and machine learning
	Create a Topic-Based eBook I can add the appropriate background and write a sentence about it I understand that JiT Mix has lots of different page layout options I can choose an appropriate page layout for my work I know how to save my JiT Paint file as an image to use in JiT Mix				

	I can add an image from a shared image bank and add text to the image I can create an eBook with at least 5 pages I can add a complex page layout with two images and two text boxes in JiT Mix I can create a food chain image with pictures and arrows in JiT Paint added into my topic eBook in JiT Mix				

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Unit Overviews

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Key Stage 1		Key Stage 2			
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Simple algorithms and programs part 1 Demonstrate logical thinking to support algorithmic thinking, prediction and debugging. Encode algorithms to a program to control a floor turtle. Activity types are unplugged and physical computing.	**Sequencing simple algorithms and programs** Sequences are the main logical structure of algorithms or programs. Children will predict and investigate route-based programs to answer numerous challenges. Some of the tasks will require the children to modify route-based programs and make their own route-based programs.	**Write a program part 1 – block-based sequences** This unit will look at debugging sequences of code. Use j2Code tool 'Visual' to create a scene with two characters having a conversation/telling a joke.	**Scratch Programming – from algorithm to code** This unit will use Scratch 3. Pupils will use various inputs and output to make this move, change size or play sounds. They will also learn how to use 'broadcast' as a conditional input.	**Programming Making Games** Develop logical thinking and coding using Scratch 3 to make a range of computer games.	**Game Design** Using Scratch 3 to effectively plan, design, and build complex code that uses pseudocode, cloning and conditional operators (Boolean).
Create simple programs part 2 Use logical thinking to evaluate algorithms and route-based programs to improve outcomes.		**Write a program part 2 drawing shapes** Complete some 'unplugged activities' (activities without a computer) to improve concepts of debugging, logical reasoning. Use j2Code tool 'Visual'. Create the code in Visual to draw simple shapes and patterns. Introduce pupils to repetition in code.	**On the Move with Programming** Using Scratch 3 to introduce movement blocks to animate sprites, changing backgrounds and using conditional statements If..Then.. Reinforcing sequence, repetition, and selection in programming.		**The Internet and World Wide Web** Understand what the internet is and discuss the services it provides. Focus in on the world wide web as a service and how data and information travels around the network. Consider how search engines help to find information and how to improve search techniques when looking for information online.
			What is Computer Technology? Looks at computers to understand what a	**Computers for Communication and Collaboration**	

			computer is made up of, how the components all work together to provide access to the technology we use today.	How computers offer opportunities for communication and collaboration; considering how technology has improved and forms of communication have changed as a result. Who has been influential in the changes of technology over time?	

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Key Skills

Key Stage 1		Key Stage 2			
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Simple algorithms and programs part 1 To understand, write and execute an algorithm, debugging where necessary To understand what sequence means and to follow an algorithm in order Understand how to control a floor-based robot, write an algorithm, and convert to code using route-based programming Use logical thinking to predict the position of a floor robot whilst creating a route-based program that achieves a specific outcome. During execution, debug code where necessary	**Sequencing simple algorithms and programs** Provide clear and precise verbal instructions in a sequence for another person to listen carefully to and follow to complete a given task. Begin to use logical reasoning to predict outcomes to design a program to control movement Use logical reasoning to follow a program and identify what the outcome will be and compare the prediction to the program outcome Using logical reasoning to predict outcomes, identify specific instructions within a program that need to be changed and replace with new instructions that will achieve the required outcome Create algorithms and programs using a set number of commands to achieve specific outcomes Follow a program in reverse to predict the starting position from a given finish position	**Write a program part 1 – block-based sequences** Decompose a task into smaller parts and give precise instructions in sequence to complete a task Know how to use block-based programming, using Motion blocks, to move a sprite forward and backwards Read and follow a block-based program to identify and correct errors that prevent the desired outcome from being achieved Use Look blocks in sequence using block-based programming and specify a time to display the look before changing to another look block command Use delay commands from the Control blocks to structure the sequence to achieve the desired timing outcomes	**Scratch Programming – from algorithm to code** Edit a sprites costume using the drawing tools and create a program using block-based coding to change the costumes of the sprite using the Looks command blocks and a loop and delay from the Control command blocks Programme several sprites that each have a different Event block that controls the start of each program. Include a variety of Looks and Motion command blocks to change the appearance and position of each of the sprites, using Control command blocks to delay between changes where necessary Programme several sprites that each have a variety of Looks and Music command blocks to change the appearance and audio played for each sprite. Include two forms of repetition from the Control command blocks – a count-controlled loop	**Programming Making Games** Use sequence, repetition, and selection to link and control the movement of one sprite with another when conditions are met using sensing blocks related to sprites or colours as an input Use sequence, repetition, and multiple selection blocks to control the movement of a sprite when conditions are met using a variety of keyboard keys as inputs to control a sprite Use sequence, repetition, and selection. Create own variables and include them within a program to keep track of a score Use sequence, repetition, and selection. Include the use of operators to allow for a range of values to be included under the	**Game Design** To know what Boolean Logic is and demonstrate how to use it with If Then Else blocks Use selection/conditional statements if…then…else. Include variables and operators to control conditions Create own variables and use cloning to make a copy of a sprite and its script which runs independently of the original. Include broadcasting to control events Use sequence, repetition, and selection to design a program to create a game that matches a design brief. Create a user manual for others to follow

		Identify inputs and outputs within a program. Use inputs to trigger events within the code	and a continuous loop to control the number of iterations that occur To use broadcasting as a method to direct the timing of events within code to trigger a script to run	selection/conditional blocks Use sequence, repetition, and selection to create procedures and sub procedures. Use procedures effectively, as part of abstraction, to help simplify complex code	
Create simple programs part 2 To give precise instructions and follow instructions given to achieve a specific outcome Use logical thinking to predict the position of a floor robot whilst creating a route-based program that achieves a specific outcome. During execution, debug code where necessary Create and debug simple programs to control an onscreen sprite using route-based programming to achieve a specific outcome Create and debug simple programs to control an onscreen sprite using route-based programming to achieve a specific		**Write a program part 2 drawing shapes** Use logical reasoning to follow and give precise instructions, including identifying errors and correcting them Use sequencing to create algorithms and identify patterns when drawing a simple polygon. Make the algorithm more efficient by using repetition where patterns have been identified. Encode algorithm to block based programming Use sequencing to create algorithms and identify patterns when drawing a more complex polygon. Make the algorithm more efficient by using repetition where patterns have been identified.	**On the Move with Programming** Control a sprite to move on the stage. Adding code so a sprite will go to an exact position on the stage Control a sprite to move with the mouse pointer Control a sprite to move using the arrow keys, changing costumes and the direction that the sprite faces to improve the aesthetics of movement Know that when selection/conditional statements if…then…are used a decision is made based on inputs received that determine which output is achieved Design and create a simple maze game that includes controlling the	**Computers for Communication and Collaboration** Know that the Internet is required to send an email and explain how email software works and what information is required to successfully send an email Know that the Internet is required to send instant or direct messages and explain how they are different to other lines of communication such as email Know that a wiki is designed for collaboration and can be edited by all users. Explain why being discerning in evaluating the content of a wiki is	**The Internet and World Wide Web** To create a drawing and text that explains what the Internet and WWW are Know what is involved in the process of requesting information from the Internet, how it is received by relevant components and returned to the user's device Know how data is broken into packets to travel from one location to another on the Internet when requested Know how search engines work to index web pages and rank results returned to the user Know how to effectively use search terms and read the anatomy of a

outcome. Use logical thinking to evaluate and improve the program		Encode algorithm to block based programming Use coding blocks that draw single polygons and embed these within a nested loop to extend the use of repetition to draw repeated shape patterns	movement of a sprite with the mouse or arrows keys, using selection to detect maze walls/objects that trigger another event	required when using it as a source of information	web address to find more accurate and relevant sources of information on the web
			What is Computer Technology? To understand what a computer is and to know the difference between hardware and software, and to differentiate between input and output devices To understand what the main parts of a computer are called and what their function is Know where and how internal components of a computer, such as the CPU, RAM and hard drive are located and how they work together to process and store data Know how data is stored and processed as binary digits in the form of bytes by the CPU and RAM. Use ASCII Code to decode bytes Know how simple binary image data is stored and		

			processed by the CPU and RAM, and displayed on screen in the form of pixels Know that coloured images have more data per pixel than black and white images and they are saved as larger data files		

Computer Science and Programming Progression

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Pupil Outcomes

Key Stage 1		Key Stage 2			
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Simple algorithms and programs part 1 I can explain what an algorithm is I understand that instructions need to be written clearly and in the correct order to complete a specific task I understand that there can be more than one way of giving instructions to complete the same task I can use logical reasoning to create a set of instructions (algorithm) to complete a specific task I can debug a simple algorithm I can reorder instructions to complete a specific task I can follow instructions I understand what a program is and how it is different to an algorithm	**Sequencing simple algorithms and programs** I can give a sequence of commands to complete a specific task I can follow a sequence of commands to complete a specific task I can predict the movement of the sprite to create a route-based program before I test it out I can debug my route-based program during running the program to correct any mistakes From given route-based programs I can predict the final outcome before running the program I can use given code as a scaffold to modify and make my own I can evaluate my algorithms to make	**Write a program part 1 – block-based sequences** I can use symbols to write an algorithm. I can debug a simple algorithm. I can create and write a simple algorithm. I can change sprites I can rename sprites I can change the background of my scene and add my choice of sprites. I can identify errors in blocks of code I can modify a sequence of code blocks to fix errors I can select my own Background and Sprites to create a simple algorithm that tells a short story / scene with characters interacting I can add an input to my code e.g. – when a key is pressed	**Scratch Programming – from algorithm to code** I can write code using a sequence I can use the drawing tools to edit sprite costumes I can duplicate a sprites costumes I can use a delay command to keep track of how long to wait between costume changes I can debug a simple algorithm I can delete and add additional sprites I can change the background of my scene I can create code using different inputs from the Events command blocks to start my programme I can reset the position of a sprite ready for the programme to be run again I can add the music extension blocks to scratch	**Programming Making Games** I can use **selection** if then to make something happen e.g. if touching another sprite then…do something I know the term input – and understand that they can trigger an event, e.g. when the green flag is clicked then… I know that sprites can be controlled by different inputs I can use – if on the edge bounce block I can identify 2 different ways to code a sprite to move using the arrow keys I can use abstraction to identify what details I need to include in a game I can compare code and explain why one is better than the other I understand that code must be precise and that some scripts are more effective than others	**Game Design** I can create a number of variables and use them correctly I can build a nest of code I can use conditional if/else blocks I know what Boolean Logic is and that computer science relies on True/False conditions being met I can create a game that has multiple random questions in a loop I can apply Boolean logic to if then else statements I can create a programme that includes the clone command I can add multiple variables to my game

I can use logical thinking to predict the behaviour of simple route-based programs to control a physical device I can write simple route-based programs to control a physical device from algorithms I can debug a simple route-based program to control a physical device	judgements on its effectiveness before I create a route-based program to complete a given task I can use logical thinking to reverse a route-based program	I can add a delay block in code e.g. wait 2 seconds I can use the 'glide to x and y' block	I can write an algorithm that contains a forever loop (continuous loop) to repeat a sequence I can write an algorithm that contains a repeat (count controlled loop) for a specific time I can identify errors in blocks of code I can modify a sequence of code blocks to fix errors I can use Broadcast messages as inputs to trigger events I can select my own Background and Sprites to create a simple algorithm that tells a short story / scene with characters interacting	I can code a sprite to hide and show again in a random position I can create a range of variables e.g. for keeping score/time I understand the difference between the x and y axis and effectively use this knowledge to create a falling sprite. I can write a script for a sprite to start at the top of the stage in a random position I can 'hide' a sprite and send it back to the top of the screen if touching another sprite I can use the ask block and know that this will require an input from the keyboard I can create and use a procedure block I can use other scratch examples to help plan my own maze game, carefully evaluating other people's code to help me I am able to use variables in nested loops I can reflect on a scratch game the game and say how to improve it further	I can include broadcasting to control events I can explain what makes a good game I can identify the components of a game I understand how code is used to create components of a game I have a complete game plan I know the audience and purpose of my game I can build code in Scratch to create a working model of my game I can debug and recall errors made
Create simple programs part 2 I understand the importance of sequence when giving instructions I can use logical thinking to predict the outcome of an algorithm and a route-based program for a screen turtle		**Write a program part 2 drawing shapes** I can predict the outcome of a simple algorithm I can write a program that creates simple shapes I can add a repeat loop into my written algorithm I can debug my program	**On the Move with Programming** I understand what an input is and how it is used to control an output I can use the move n steps block I understand that the stage area is divided into		**The Internet and the World Wide Web** I know that the internet is not the same as the world wide web I can explain what the internet is I know that the World Wide Web is only one of

I can create a simple route-based program for a screen turtle I can debug my simple route-based program for a screen turtle I know that there is more than one way to solve a problem, but some are more efficient than others I can use logical thinking to evaluate my algorithm and route-based program to improve the outcome		I can write a program that creates simple shapes I can write a program that creates repeated shapes on the screen I can use a nested loop I can explain why I have used a nested loop	quadrants using the x and y axis I can create a script that resets the starting position of a sprite using the 'go to' block I can change the orientation of a sprite, using the costumes tab, to improve the appearance of movement I can make a sprite move by following the mouse pointer I can use a continuous loop in my code I can move a sprite up, down, left, and right using the arrow keys as an input I can change the look of a sprite, through code, to switch between costumes I can use 'point in the direction of' block to improve the appearance of the sprite before it moves left or right I understand that the selection/condition input needs to be met before the associated output will happen I can use if then statements in my code		the services provided by the Internet I know what a hyperlink is and how it is used to link from one document to another location I know the differences between a web browser and a web server I know how information on the World Wide Web travels between networked computers to retrieve and deliver requested information I understand that information is broken down into small pieces known as packets I know that information in the packet, like IP Address, will help the packet arrive at the correct destination I understand that individual packets travel across networks, taking different routes in order to reach their destination quickly and efficiently I know that once the packets arrive at their destination the information is then built back up to its original state

			blocks to sense and control events I can resize a sprite I can create a plan that identifies sprites and the backdrops to be used in a maze game I can create algorithms that are logical and in the correct order, giving precise instructions for each part of my maze game I can debug my code and correct the errors I can use the paint tools in Scratch 3 to draw my own backdrops		I know what a web browser is and how it is different to a search engine I understand what a web crawler/spider is and how it links to a search engine I understand how search engines select and rank results using page ranking processes and algorithms I can look at a search result and am able to identify the best link to choose from I know that .gov.uk is a site by UK government I know that .ac is a site from an academic institution I know that different countries have a unique identifier at the end of a URL I know how to improve a search result by adding key words, or quotation marks around a phrase

			What is Computer Technology? I can explain the difference between hardware and software I can explain the difference between an input and an output device I can give examples of computer input and output devices I know that there are key parts needed to make a computer work which are kept safe inside the computers case I know that data stored in the computer's memory are called BITS I know that a BIT can either be 1 or 0 I can name the internal parts of a computer that make it work I can explain the function of the internal parts of a computer I understand how one computer can be connected to another computer using a network to allow the computers to communicate with each other	**Computers for Communication and Collaboration** I know that the internet allows us to communicate with people all over the world through audio, text and video I know what email is I know how to write an email I know what instant or direct messaging is I know what a wiki is I can work collaboratively online to create and present information I can explain what some of the risks are when communicating online with others I know that instant/direct messaging can be to one person or to many at the same time I know the difference between misinformation and disinformation I can suggest suitable strategies to help with spotting fake news when gathering information online I can name some famous men and women that have been instrumental in the	

			I know how the RAM helps the CPU to carry out tasks I can explain how the computer knows what key has been pressed on a keyboard I know that 8 bits is known as a 1 byte I know what the ASCII Code is I know that letters, numbers, and symbols are stored as bytes in the computer's memory I can explain what a pixel is I understand how a computer stores the data required to display a binary black and white image I understand binary data and can re-create a binary image I know that coloured images have more data per pixel than black and white images I understand that coloured image data is stored as 24-bits per pixel	development of computers and technology	

Collecting, Evaluating and Presenting Information		Data Handling	Computer Science and Programming	
Just Paint and Write Pt 1 – All About Me Use a range of tools within paint - change the brush size, colour, and texture to draw pictures. Know how to clear a mistake. Save as a paint file, an image, and stamp Become familiar with typing on a keyboard and begin to use simple tools to change the appearance of the text. Upload an image as a background Independently use paint tools, including adding relevant stamps, to build up a picture Know how to add a text stamp and customise the text before adding to the paint file With increasing independence, type on the keyboard and begin to use simple tools to change the appearance of the text. Upload an image as a background	**Collect Photographs and Paint Pictures – Pt 2** With increasing independence, type on the keyboard and begin to use simple tools to change the appearance of the text. Upload an image as a background Know what makes a good photograph composition and how to use a digital camera to take a photograph. Compose and capture own photographs Independently use a range of tools within paint – change the brush size, colour and texture to draw pictures. Know how to clear a mistake Know that photographs can be changed after taking them using image editing tools to change the colour effect and overall appearance of an image Create a compilation of work and explain the tools used to create each piece of work	**Gathering Data and Creating Charts** Know what the term data means and how we can collect data and present it in the form of a tally chart and pictogram Collect data to create a tally chart. Use the chart to create a pictogram and explain what the pictogram shows by interpreting the data Gather data and present as a pictogram. Know that data can be represented in other ways than using a tally chart or pictogram. Use the pictogram to create a block chart	**Simple Algorithms and Programs Pt 1** To understand, write and execute an algorithm, debugging where necessary To understand what sequence means and to follow an algorithm in order Understand how to control a floor-based robot, write an algorithm and convert to code using route-based programming Use logical thinking to predict the position of a floor robot whilst creating a route-based program that achieves a specific outcome. During execution, debug code where necessary	**Create Simple Programs Pt 2** To give precise instructions and follow instructions given to achieve a specific outcome Use logical thinking to predict the position of a floor robot whilst creating a route-based program that achieves a specific outcome. During execution, debug code where necessary Create and debug simple programs to control an onscreen sprite using route-based programming to achieve a specific outcome Create and debug simple programs to control an onscreen sprite using route-based programming to achieve a specific outcome. Use logical thinking to evaluate and improve the program

Computing Key Skills by Year Group

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Year 2 Computing Key Skills Overview

Collecting, Evaluating and Presenting Information			Data Handling	Computer Science and Programming
Ways to Present Information	**Art of Animation**	**Create a Topic-Based eBook**	**Collecting, organising and presenting data**	**Sequencing simple algorithms and programs**
Search for appropriate images online and use paint tools to create additional features to design a digital picture that tells/explains a specific story or process Use digital pictures created as backgrounds for writing. Use the mouse cursor to select text then use text editing tools to change the appearance of the text Know that animation is another method to present information. Create multiple frames that contain images with each image being slightly different from the previous one	Upload an image from shared files to a paint file and use the fill tool to add colour to certain areas of the image. Save as a paint file and as an image Upload image saved to animate, duplicate frames and add ABC.. stamps to particular frames, using them as labels to identify the continents and oceans, making sure that the frames last long enough for the information to be read before moving on to the next labelled frame Create a paint project and use a variety of tools to create a scene and save as a paint file and an image Create individual paint projects and use a variety of tools to create objects related to the scene and save each one as a paint file and stamp Create an animation using onion skinning as the technique when working on the next frame to show movement. Upload the image of the scene as a background, stamps created in Paint and stamps saved in shared files to tell a story	Make appropriate choices on the layout and presentation of a title page. Include an image – either digital photo or a drawing and add text Use digital pictures as backgrounds for writing. Use the mouse cursor to select text then use text editing tools to change the appearance of the text Use paint and write programs to design and create content, making use of the various tools to produce paint files, stamps and write files. Combine work in a digital portfolio	Know what a multiple-choice question is and why they are a good way of collecting data from lots of people. Answer multiple-choice questions for the purpose of collecting data Know that there are other ways to gather data by asking questions that are not multiple-choice by using yes/no questions. Design multiple-choice questions and yes/no questions to gather data To create charts from information in tally tables and interpret the data from the chart Know what characteristics are and how to use them to sort groups of objects by using yes/no questions. Use a branching database to answer questions Mistakes can be made when collecting and organising data. If the mistakes are not found it makes the data unreliable	Provide clear and precise verbal instructions in a sequence for another person to listen carefully to and follow to complete a given task. Begin to use logical reasoning to predict outcomes to design a program to control movement Use logical reasoning to follow a program and identify what the outcome will be and compare the prediction to the program outcome Using logical reasoning to predict outcomes, identify specific instructions within a program that need to be changed and replace with new instructions that will achieve the required outcome Create algorithms and programs using a set number of commands to achieve specific outcomes Follow a program in reverse to predict the starting position from a given finish position

Computing Key Skills by Year Group

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Year 3 Computing Key Skills Overview

Collecting, Evaluating and Presenting Information		Data Handling	Computer Science and Programming	
Organising, Creating and Presenting Know how to add text, borders, and images, making appropriate choices regarding position, size, colour and theme Know how to present work clearly and for appeal/interest. Use tools to layer and arrange images and text that can be clearly read/seen Take photographs and mask the background to make the image transparent. Upload and layer onto other images Create an animation using onion skinning technique and save as a GIF. Embed the GIF into another document	**QR Codes** Create QR codes using a QR code generator. Understand how the QR code links to the location of where the information is stored Scan QR Codes to access information easily. Understand that each QR code is unique and can only link to one location/information source Record an audio file and create a QR code to share its location with others Create QR codes that link to different media e.g. websites, audio files, notes to provide easily accessible information	**Creating a branching database and interrogating simple databases** Know what characteristics are and how to use them to sort groups of objects by using yes/no questions. Use a branching database to answer questions Know that yes/no questions need to be ordered carefully when grouping objects to create the structure for a branching database Know the term 'database' and how they are used to store and organise data using key characteristics Use tools within a database to order and answer questions about the data using simple searches Develop search techniques to match data from more than one field using 'AND' and 'OR' to refine results Know that a database may contain errors and can affect search results	**Write a program part 1 – block-based sequences** Decompose a task into smaller parts and give precise instructions in sequence to complete a task Know how to use block-based programming, using Motion blocks, to move a sprite forward and backwards Read and follow a block-based program to identify and correct errors that prevent the desired outcome from being achieved Use Look blocks in sequence using block-based programming and specify a time to display the look before changing to another look block command Use delay commands from the Control blocks to structure the sequence to achieve the desired timing outcomes Identify inputs and outputs within a program. Use inputs to trigger events within the code	**Write a program part 2 drawing shapes** Use logical reasoning to follow and give precise instructions, including identifying errors and correcting them Use sequencing to create algorithms and identify patterns when drawing a simple polygon. Make the algorithm more efficient by using repetition where patterns have been identified. Encode algorithm to block based programming Use sequencing to create algorithms and identify patterns when drawing a more complex polygon. Make the algorithm more efficient by using repetition where patterns have been identified. Encode algorithm to block based programming Use coding blocks that draw single polygons and embed these within a nested loop to extend the use of repetition to draw repeated shape patterns

Year 4 Computing Key Skills Overview

Collecting, Evaluating and Presenting Information	Data Handling	Computer Science and Programming		
Multimedia Fact File To know how to present information on a page using text and images. Plan a non-linear presentation, making appropriate choices for layout and content to present the information clearly. Be aware of copyright issues surrounding the use of images online To know and use different ways of presenting information to make the content more engaging and accessible through the use of sound files and embedded videos Create multiple pages for their presentation and use hyperlinks to link them together as detailed in their planning to create a non-linear presentation	**Creating and interrogating simple databases** To locate data organised in a paper-based record card database, identifying fields and data to answer specific questions Design a questionnaire using a range of data types and open and closed questions to gather useful data that is fit for purpose to solve a given problem Use an electronic database to look at how data can be recorded. Enter data to create records under appropriate field names Use an electronic database to examine how data can be viewed, sorted and searched for Create and use charts to visually compare data and answer questions about it	**Scratch Programming – from algorithm to code** Edit a sprites costume using the drawing tools and create a program using block-based coding to change the costumes of the sprite using the Looks command blocks and a loop and delay from the Control command blocks Programme several sprites that each have a different Event block that controls the start of each program. Include a variety of Looks and Motion command blocks to change the appearance and position of each of the sprites, using Control command blocks to delay between changes where necessary Programme several sprites that each have a variety of Looks and Music command blocks to change the appearance and audio played for each sprite. Include two forms of repetition from the Control command blocks – a count-controlled loop and a continuous loop to control the number of iterations that occur To use broadcasting as a method to direct the timing of events within code to trigger a script to run	**On the Move with Programming** Control a sprite to move on the stage. Adding code so a sprite will go to an exact position on the stage Control a sprite to move with the mouse pointer Control a sprite to move using the arrow keys, changing costumes and the direction that the sprite faces to improve the aesthetics of movement Know that when selection/conditional statements if…then…are used a decision is made based on inputs received that determine which output is achieved Design and create a simple maze game that includes controlling the movement of a sprite with the mouse or arrows keys, using selection to detect maze walls/objects that trigger another event	**What is Computer Technology?** To understand what a computer is and to know the difference between hardware and software, and to differentiate between input and output devices To understand what the main parts of a computer are called and what their function is Know where and how internal components of a computer, such as the CPU, RAM and hard drive are located and how they work together to process and store data Know how data is stored and processed as binary digits in the form of bytes by the CPU and RAM. Use ASCII Code to decode bytes Know how simple binary image data is stored and processed by the CPU and RAM, and displayed on screen in the form of pixels Know that coloured images have more data per pixel than black and white images and they are saved as larger data files

Computing Key Skills by Year Group

Year 5 Computing Key Skills Overview

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Collecting, Evaluating and Presenting Information	Data Handling	Computer Science and Programming	
Infographics Know that an infographic is a creative way of presenting key information through text, images, tables, charts, and graphs Know how colour can be used to enhance ways of presenting information, making careful choices regarding legibility and the intended effect on mood and associations Make choices about the style of text and images to use. Understand about copyright issues on images and abide by licences Organise and present information in the style of an infographic	**Creating and using spreadsheets as models to solve problems** Organise data into columns and rows to create own data sets and apply formulae using cell references that include a range of cells to calculate data Use a spreadsheet to answer questions and identify that changing inputs will change the output of a calculation where formula is used Create a spreadsheet by organising data into columns and rows using appropriate headings and create simple formulae using the four basic maths operations (+, -, x and ÷) using cell references where appropriate to calculate the data to model and answer questions Create a spreadsheet by organising data into columns and rows using appropriate headings and create formulae, including minimum, maximum and average, using cell references to calculate the data Design a spreadsheet to model a real-life problem using appropriate formulae using cell references to calculate data. Create graphs to display data to evaluate results in comparison to the problem being modelled	**Programming Making Games** Use sequence, repetition, and selection to link and control the movement of one sprite with another when conditions are met using sensing blocks related to sprites or colours as an input Use sequence, repetition, and multiple selection blocks to control the movement of a sprite when conditions are met using a variety of keyboard keys as inputs to control a sprite Use sequence, repetition, and selection. Create own variables and include them within a program to keep track of a score Use sequence, repetition, and selection. Include the use of operators to allow for a range of values to be included under the selection/conditional blocks Use sequence, repetition, and selection to create procedures and sub procedures. Use procedures effectively, as part of abstraction, to help simplify complex code	**Computers for Communication and Collaboration** Know that the Internet is required to send an email and explain how email software works and what information is required to successfully send an email Know that the Internet is required to send instant or direct messages and explain how they are different to other lines of communication such as email Know that a wiki is designed for collaboration and can be edited by all users. Explain why being discerning in evaluating the content of a wiki is required when using it as a source of information

Computing Key Skills by Year Group

Year 6 Computing Key Skills Overview

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Collecting, Evaluating and Presenting Information		Data Handling	Computer Science and Programming	
Understanding Big Data	**Artificial Intelligence and Machine Learning**	**Analyse and interpret data using spreadsheets**	**Game Design**	**The Internet and World Wide Web**
Understand how our data can be actively and passively collected, stored, and used by others when we connect to the Internet Know that data can't be collected by companies without prior consent from the user. Understand the importance of terms and conditions and a user's 'choice' to allow data to be collected, stored, and shared Know how data can be accessed and used without user consent or knowledge through hacking. Understand that hacking is a criminal offence and ethical hacking is not Know that a cookie is used by websites to remember you, your preferences, and your habits online	Know how to be discerning in evaluating digital content showing an awareness of misinformation and disinformation Know how artificial intelligence and machine learning works using big data to learn from Understand artificial intelligence and machine learning and how it benefits others Using IBM Watson train a Smart Assistant to switch devices on/off e.g. a lamp and a fan using AI and ML	Create formulae using cell references, including a range of cells to produce calculated data Create formulae using the four basic maths functions (+, -, x, ÷) and cell addresses where appropriate, using brackets to order mathematical operations Apply appropriate number and text formats to cells. Remove and add data to a spreadsheet and adjust formulae where required. Use the spreadsheet model to answer questions that model real-life events Create a spreadsheet by organising data into columns and rows using appropriate headings and create simple formulae using the four basic maths operations (+, -, x and ÷) using cell references where appropriate to calculate the data to model and answer questions Add data to a pre-populated spreadsheet and use formulae, using cell addresses and cell ranges where appropriate to model real-life scenarios and answer questions	To know what Boolean Logic is and demonstrate how to use it with If Then Else blocks Use selection/conditional statements if…then…else. Include variables and operators to control conditions Create own variables and use cloning to make a copy of a sprite and its script which runs independently of the original. Include broadcasting to control events Use sequence, repetition, and selection to design a program to create a game that matches a design brief. Create a user manual for others to follow	To create a drawing and text that explains what the Internet and WWW are Know what is involved in the process of requesting information from the Internet, how it is received by relevant components and returned to the user's device Know how data is broken into packets to travel from one location to another on the Internet when requested Know how search engines work to index web pages and rank results returned to the user Know how to effectively use search terms and read the anatomy of a web address to find more accurate and relevant sources of information on the web

Suggested pathway for schools new to the scheme of work

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Suggested roll-out of delivery for those schools new to the scheme of work where students may have limited prior knowledge and experience. Units not mentioned below can be taught as outlined in year group overviews.

	Information Technology Progression for Data Handling, Databases and Spreadsheets	**Computer Science and Programming**
First academic year delivering planning	Year 1 and Year 2 follow the Year 1 unit 'Gathering Data and Creating Charts' Year 3 and 4 follow the Year 3 unit 'Creating a Branching Database and Interrogating Simple Databases' with the last lesson from Year 2 unit 'Collecting, Organising and Presenting Data' Year 5 and 6 follow the Year 5 unit 'Creating and Using Spreadsheets as Models to Solve Problems'	Year 1, 2 and 3 follow the units suggested. Year 4, 5 and 6 students who are new to Scratch programming follow the two Year 4 units 'Scratch Programming from Algorithm to Code' and 'On the Move with Programming'
Second academic year delivering planning	Year 1 and Year 2 follow units as is. Year 3 follow the Year 3 unit 'Creating a Branching Database and Interrogating Simple Databases' with the last lesson from Year 2 unit 'Collecting, Organising and Presenting Data' (Y2 planning was not followed the previous year to help with falling into line with a new scheme of work) Year 4 follow the Year 4 unit Year 5 follow the Year 5 unit (doesn't matter that the Year 4 unit was not covered last year with this class as they picked up key database skills in Year 3 and move on to Year 5 for new learning on spreadsheets to prepare for moving in to Year 6 next year) Year 6 follow the Year 6 unit	Year 1 and Year 2 follow units as is. Year 3 follow unit as is. Year 4 follow unit as is. Year 5 and 6 follow the Year 5 unit 'Programming Making Games'