Newhampton Church of England
School Computing Curriculum
Overview

Our Ultimate End Goal:
By the end of their time at Newhampton Federation our Year 6 children will: • use computational thinking and creativity to understand and change the world; • think and work creatively, analytically and solve problems; • be digitally literate; • use a variety of software and hardware; • understand how to use technology safely and appropriately.

Early Years Foundations Stage Framework and National Curriculum Coverage			
EYFS	Key Stage 1	Key Stage 2	
Reception	Year 1 and Year 2	Year 3 and Year 4	Year 5 and Year 6
Although the Framework for Early Years Foundation Stage (Sept. 2021) does not explicitly mention computing within it, we provide many opportunities for children to use technology to solve problems and produce creative outcomes.	• 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	• design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts • use sequence, selection, and repetition in programs; work with variables and various forms of input and output • use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs • understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration • use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content • select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information • use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.	

Our school has adapted the Department for Education's 'Teach Computing Curriculum for KS1 and KS2' (https://teachcomputing.org/) to reflect our mixed age class structure and need for a two-year rolling computing curriculum.

KS1 and KS2 teacher's use the 'Teach Computing' lesson plans to inform their computing planning and meet the needs of the pupils in their class. Lessons have clear learning objectives and key vocabulary is identified. Every lesson includes formative assessment. Summative assessment opportunities are built in across the year.

EYFS incorporates aspects of 'Barefoot Computing at Schools'… https://www.barefootcomputing.org/earlyyears

The Teach Computing Curriculum is a progressive learning curriculum with a recommended, but not prescriptive, teaching order. The general approach to implementing the computing curriculum content for mixed year groups is to teach units for the lower year group in the first three teaching blocks, and units for the higher year group in the last teaching blocks. There are some dependencies between units and where there is a possibility of these units not being taught in order, they have been noted and mitigations have been devised within medium term plans.

A benefit of this approach is that both **Computing Systems and Networks** unit will be taught in one cycle, and both **Data and Information** units will be taught in the other. 50% of the time, there are dependencies between units in consecutive years of these strands. By teaching both units of each strand in a single cycle, it removes the possibility of some children being taught those units in the incorrect order. The compromise is that each strand will only be taught every other cycle.

Overview of Dependencies within the 'Teach Computing Curriculum' and our Curriculum Design:

		No Dependencies	Dependencies
Year 1 / 2	Cycle A	• Unit 1.4 • Unit 1.5 • Unit 2.5	• Unit 1.6 assumes that the core concepts have already been taught in unit 1.3 and compares implementing those concepts using the floor robots and ScratchJr. It is possible to teach the core concepts equally well with both floor robots and ScratchJr so the curriculum will be modified to include the core concepts in both unit 1.3 and unit 1.6, and the contrasting exercise will also be included in both units. This will make the order of delivery less critical, and allow some additional time year 1 students learning the concepts for the first time whilst year 2 students compare with their experience from the previous year/cycle. • Unit 2.4 depends on concepts taught in unit 1.4, which is in the same cycle. • Unit 2.6 has a dependency on unit 1.6, which is in the same cycle.
	Cycle B	• Unit 1.1 • Unit 1.2 • Unit 1.3 has no dependencies in the curriculum however, it is a dependency of unit 1.6. See the notes for unit 1.6 for details of how this will be managed. • Unit 2.1 • Unit 2.2	• Unit 2.3 has a dependency on unit 1.3, which is in the same cycle.

		No Dependencies	Dependencies
Year 3 / 4	Cycle A	• Unit 3.4 • Unit 3.5 • Unit 4.3 - it introduces the Logo programming language. • Unit 4.4 • Unit 4.5	• Unit 4.6 has a dependency on unit 4.3. It covers the same concept of repetition but uses the Scratch programming language, and invites students to compare the Scratch and Logo programming languages. The Scratch programming language is used in cycle A so year 4 children will already be familiar with it however, this unit has been modified to introduce Scratch in a similar manner to unit 3.3, but covering the concepts of repetition.
	Cycle B	• Unit 3.1 • Unit 3.2 • Unit 3.3 - it assumes that KS1 has been completed and introduces the Scratch programming language. • Unit 4.2	• Unit 3.6 has a dependency on unit 3.3, which is in the same cycle. • Unit 4.1 has a dependency on unit 3.1, which is in the same cycle.

		No Dependencies	Dependencies
Year 5 / 6	Cycle A	• Unit 5.4 • Unit 5.5 • Unit 6.4 • Unit 6.5	• Unit 5.6 has a dependency on unit 5.3. • Unit 6.6 has dependencies on units 5.3/5.6 and 6.3. Unit 5.6 is in the same cycle. The concept of variables will have to be taught in this module so the unit will be modified accordingly.
	Cycle B	• Unit 5.1 • Unit 5.2 • Unit 5.3 - It introduces microcontrollers and the Crumble programming environment. • Unit 6.1 • Unit 6.2	• Unit 6.3 has a dependency on selection which is taught in units 5.3 and 5.6. Unit 5.3 is in the same cycle and the learning from that unit should be sufficient to complete unit 6.3.

The Teach Computing Curriculum has been developed by the National Centre for Computing Education's (NCCE). All learning outcomes can be described through a high-level taxonomy of ten strands, ordered alphabetically as follows:

- **Algorithms** — Be able to comprehend, design, create, and evaluate algorithms
- **Computer networks** — Understand how networks can be used to retrieve and share information, and how they come with associated risks
- **Computer systems** — Understand what a computer is, and how its constituent parts function together as a whole
- **Creating media** — Select and create a range of media including text, images, sounds, and video
- **Data and information** — Understand how data is stored, organised, and used to represent real-world artefacts and scenarios
- **Design and development** — Understand the activities involved in planning, creating, and evaluating computing artefacts
- **Effective use of tools** — Use software tools to support computing work
- **Impact of technology** — Understand how individuals, systems, and society as a whole interact with computer systems
- **Programming** — Create software to allow computers to solve problems
- **Safety and security** — Understand risks when using technology, and how to protect individuals and systems

KS1 and KS2 Two Year Curriculum Cycle – Long Term Plan

		Teaching Block 1	Teaching Block 2	Teaching Block 3	Teaching Block 4	Teaching Block 5	Teaching Block 6
Cycle A	**Year 1/2**	Data and information	Creating media	Programming B	Data and information	Creating media	Programming B
		1.4 Grouping data	1.5 Digital Writing	1.6 Programming animations	2.4 Pictograms	2.5 Digital music	2.6 Programming quizzes
		Education for a Connected World					
		Copyright and Ownership	Privacy and Security		Self-image and Identity Health, Wellbeing and Lifestyle Privacy and Security	Copyright and Ownership	
	Year 3/4	Data and information	Creating media	Programming A	Data and information	Creating media	Programming B
		3.4 Branching databases	3.5 Desktop publishing	4.3 Repetition in shapes	4.4 Data logging	4.5 Photo editing	4.6 Repetition in games
		Education for a Connected World					
			Managing Online Information Copyright and Ownership			Self-image and Identity	
	Year 5 / 6	Data and information	Creating media	Programming B	Data and information	Creating media	Programming B
		5.4 Flat-file databases	5.5 Introduction to vector graphics	5.6 Selection in quizzes	6.4 Introduction to spreadsheets	6.5 3D modelling	6.6 Sensing movement
		Education for a Connected World					
					Managing Information Online	Privacy and Security	

		Teaching Block 1	Teaching Block 2	Teaching Block 3	Teaching Block 4	Teaching Block 5	Teaching Block 6
Cycle B	**Year 1/2**	**Computing systems and networks**	**Creating media**	**Programming A**	**Computing systems and networks**	**Creating media**	**Programming A**
		1.1 Technology around us	1.2 Digital painting	1.3 Moving a robot	2.1 Information technology around us	2.2 Digital photography	2.3 Robot algorithms
		Education for a Connected World					
		Health, Wellbeing and Lifestyle / Copyright and Ownership			Health, Wellbeing and Lifestyle	Self-image and Identity	
	Year 3/4	**Computing systems and networks**	**Creating media**	**Programming A**	**Computing systems and networks**	**Creating media**	**Programming B**
		3.1 Connecting computers	3.2 Stop-frame animation	3.3 Sequencing sounds	4.1 The internet	4.2 Audio production	3.6 Events and actions in programs
		Education for a Connected World					
			Managing Online Information / Copyright and Ownership		Managing Online Information	Copyright and Ownership	
	Year 5/6	5.1 Systems and searching	5.2 Video production	5.3 Selection in physical computing	6.1 Communication and collaboration	6.2 Webpage creation	6.3 Variables in games
		Education for a Connected World					
		Managing Information Online			Online Relationships / Copyright and Ownership	Online Relationships / Managing Information Online	

Procedural and Propositional Knowledge Across the Curriculum

COMPUTING SYSTEMS AND NETWORKS

	Key Stage 1		Key Stage 2			
	Year 1 and 2		Year 3 and 4		Year 5 and 6	
Procedural Knowledge - Skills children will develop in the computing curriculum.	**1.1 Technology Around Us**	**2.1 IT Around Us**	**3.1 Connecting Computers**	**4.1 The Internet**	**5.1 Systems and Searching**	**6.1 Communication and Collaboration**
	• 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 (i.e. mouse, keyboard) - be able to use them and edit text.. • Show how to use technology safely.	• Describe some uses of computers. • Identify information technology in and beyond school. • Show how to use information technology safely.	To explain: • that a computer system accepts an input and processes it to produce an output; • how a computer network can be used to share information; • the role of a switch server, and wireless access point in a network. Identify: • input and output devices; • networks devices around me and how networks can be connected to other networks.		• Describe the input and output of a search engine. • Demonstrate that different search terms produce different results. • Evaluate the results of search terms	• 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

Propositional knowledge – The concepts children will develop and understand within each unit of learning.	• Explain that technology is something that can help us – give examples of how. • Identify examples of technology and how technology helps us. • Understand why rules are needed when using technology. Recognise that: • a computer is an example of technology; • choices are made when using technology;	• Say how rules for using information technology can help us. • Explain how information technology benefits us. • Identify that a computer is a part of information technology. Recognise: • different types of computers used in school; • features and uses of information technology; • that choices are made when using information technology.	• Describe what an input is. • Identify the benefits of computer networks Identify how: • changing the process can affect the output; • devices in a network are connected with one another; Explain: • that a process acts on the inputs; • that an output is produced by the process; • how computer systems can change the way that we work; • how information is passed through multiple connections Recognise that: • a digital device is made up of several ports; • computers can be connected to each other; • a network is made up of a number of components.	• Outline how information can be shared via the World Wide Web (www). • Evaluate the reliability of content and the consequences of unreliable content. Describe: • how networks connect to other networks. • how to access the www; • the types of content/media that can be added, created, and shared on the www; • the current limitations of www media. Explain: • how the content of the www is created, owned, and shared by people; • that the global interconnection of networks is the internet. • the benefits of the www. Recognise: • that the www is part of the internet; • the need for security on the internet;	• Describe the role of a particular IT system in their lives • Relate that search engines are examples of large IT systems. Recognise: • that a system is a set of interconnected parts which work together; • inputs, processes, and outputs in large IT systems. Explain: • that computers can be connected together to form IT systems; • why search engines create indices, and that they are different for each search engine; • that ranking orders search results to make them more useful; • how ranking is determined by rules, and that different search engines use different rules; • why the order of results is important and to whom; • how search engines make money by selling targeted advertising space; • the role of web crawlers in creating an index; • how search results are selected.	• Discuss the opportunities that technology offers for communication and collaboration. Recognise that: • data is transferred across networks using agreed protocols (methods); • connections between computers allow access to shared stored files; • computers connected to the internet allow people in different places to work together; Explain: • that data is transferred in packets; • which types of media can be shared through the internet; • that communicating and collaboration using the internet can be public or private.

					Identify that: • that data can be transferred between IT systems; • some of the limitations of search engines.	

CREATING MEDIA – STOP-FRAME ANIMATION

	Key Stage 1		Key Stage 2			
	Year 1 and 2		Year 3 and 4		Year 5 and 6	
	1.2 Digital Painting	2.2 Digital Photography	3.2 Stop-frame Animation	4.2 Audio Production	5.2 Video Production	6.2 Webpage Creation
Procedural Knowledge - Skills children will develop in the computing curriculum.	• Create a picture using freehand tools. • Use a range of paint colours and art tools when precision is needed (i.e. shape, line, colour). • Use the undo button to correct a mistake. • Combine tools to create artwork.	• Capture a digital image / photograph on digital devices in both landscape and portrait format. • Hold a camera still (and use zoom) to take clear photographs. • Consider the lighting and use filters to edit photographs. • To decide which photographs to keep or improve by retaking.	• Plan an animation using a story board. • Set up the work area with an awareness of what will be captured. • Capture an image. • Use the onion skinning tool to review subject position. • Move subject between capture. • Review a captured sequence of frames as an animation. • Add / remove media to enhance animation.	• Record sound using a computer. • Play recorded audio. • Import audio into a project. • Delete a selection of audio. • Change the volume of tracks in a project.	• Identify features of a video recording device or application. • Combine filming techniques for a given purpose. • Determine what scenes to use to convey ideas. • Decide what changes I will make when editing. • Choose to reshoot a scene or improve later through editing. Use: • different camera angles; • pan, tilt and zoom; • split, trim and crop to edit a video.	• Review an existing website (navigation bars, header). • Create a new blank web page. • Add text to a web page. • Set the style of text on a web page. • Change the appearance of text. • Embed media in a web page. • Add web pages to a website. • Preview a web page (different screen sizes). • Insert hyperlinks between pages / to another site

Propositional knowledge - The concepts children will develop and understand within each unit of learning.						
	• Explain what different freehand tools do and decide when it is appropriate to use each tool. • Recognise that computers can be used to create art. • Decide when it's appropriate to use each tool – consider impact of choices made. • Compare painting using a computer with using brushes.	• Recognise that digital devices can capture images using a camera and that these photos can be saved and viewed later. • Talk about how to take a photograph and make choices when composing photographs. • Recognise features of a 'good' photograph. • Identify how to improve, retake and change a photograph. • Explain the effect of light on a photograph. • Recognise that some images are not accurate. • Recognise that photographs can be changed after they have been taken.	• Identify that a capturing device needs to be in a fixed position. • Recognise that smaller movements create smoother animations. Explain the: • need for consistency in working; • impact of adding other media to an animation. Explain that: • a project must be exported so it can be shared; • an animation is made up of a sequence of images.	• Consider the results of editing choices made. Identify that: • sound can be recorded; • an input device is needed to record sound; • output devices are needed to play audio. Recognise that: • recorded audio can be stored on a computer; • audio can be edited; • sound can be represented visually as a waveform; • audio can be layered so that multiple sounds can be played at the same time.	Explain the: • features of video as a visual media format; • purpose of a storyboard; • limitations of editing video on a recording device. Recognise: • which devices can and can't record video; • that filming techniques can be used to create different effects; • the need to regularly review and reflect on a video project; • projects need to be exported to be shared. Identify: • that videos can be edited on a recording device or on a computer; • videos can be improved through and reshooting or editing	• Consider the ownership and use of images (copyright). Recognise: • the relationship between HTML and visual display; • that web pages can contain different media types; • that web pages are written by people; • that a website is a set of hyperlinked web pages; • components of a web page layout; • the need to preview pages (different screens / devices); • the need for a navigation path; • the implications of linking to content owned by others.

CREATNG MEDA – DESKTOP PUBLISHING

	Key Stage 1		Key Stage 2			
	Year 1 and 2		Year 3 and 4		Year 5 and 6	
	1.5 Digital Writing	**2.5 Digital Music**	**3.5 Desktop Publishing**	**4.5 Photo Editing**	**5.5 Introduction to Vector Graphics**	**6.5 3D Modelling**
Procedural Knowledge - Skills children will develop in the computing curriculum.	• To select, position and change the appearance of text to achieve a desired effect. To use: • a range of keys (i.e. letter, number, space, backspace and punctuation) to enter / remove text; • undo.	• Experiment with musical patterns and different sounds on a computer. • Evaluate and improve a musical composition created on a computer. Use a computer to • compose a rhythm and melody based on a theme; • play the same music in different ways (i.e. tempo).	• Change page orientation. • Organise, add and remove text and image to and from placeholders. • Edit text and images, including moving and resizing. • Choose fonts and apply effects to text. • Review a document	• To use an application to change the whole and part of a digital image • Change the composition of an image (rotate, flip, arrange, crop or cut) • Apply a change globally (adjust colours, apply filters, add effects) • Apply changes locally (adjust colour, retouch, reuse) • Make additions (draw, add text, add an element) • Use clone, copy, and paste to change the composition of a digital image • Use cloning to retouch a digital image • Add text to a digital image	• Add an object to a vector drawing. • Select, duplicate, modify, reposition and delete objects. • Move objects between layers of a drawing. • Group and ungroup selected objects.	• Position 3D shapes relative to one another • Combine objects to create a 3D digital artefact • Construct a 3D model which reflects a real world object To use digital tools to: • modify 3D objects • accurately size 3D objects

Propositional knowledge - The concepts children will develop and understand within each unit of learning.	To recognise that: • a keyboard is used to enter text into a computer; • the shift key changes the output of a key; • text can be changed – visual appearance and editing.	• Identify that computers can be used to play sounds of different instruments. • Identify that the same pattern can be represented in different ways. • Compare playing music with instruments to making music on a computer.	• Define landscape and portrait as two different page orientations. To recognise: • how text and images can be used together to convey information; • that DTP pages can be structured with placeholders; • how different font styles and effects are used for particular purposes; To consider: • how different layouts can suit different purposes; • the benefits of using DTP applications.	• Choose the most appropriate tool for a particular purpose • Consider the impact of changes made on the quality of the image. • To recognise that digital images can be manipulated and changed for different purposes;	• To identify that a vector drawing comprises separate objects; • To explain how alignment and size guides can help create a more consistent drawing. • To consider the impact of choices made. To recognise that: • each object in a drawing is in its own layer; • vector images can be scaled without impact on quality • objects can be modified in groups.	• Explain that 3D models can be created on a computer • Show how placeholders can create holes in 3D objects To recognise that • a 3D environment can be viewed from different perspectives; • digital tools can be used to manipulate 3D objects; • artefacts can be broken down into a collection of 3D objects.

PROGRAMMING A and B						
	Key Stage 1		**Key Stage 2**			
	Year 1 and 2		**Year 3 and 4**		**Year 5 and 6**	
	1.3 Moving a Robot **1.6 Programming Animations**	**2.3 Robot Algorithms** **2.6 Programming Quizzes**	**3.3 Sequencing Sounds** **3.6 Events and Actions**	**4.3 Repetition in Shapes** **4.6 Repetition in Games**	**5.3 Selection in Physical Computing** **5.6 Selection in Quizzes**	**6.3 Variables in Games** **6.6 Sensing Movement**
Procedural Knowledge - Skills children will develop in the computing curriculum.	• To run a program on a device. To choose a series of: • words that can be enacted as a program; • of commands that can be run as a program.	• Choose a series of words that can be enacted as a 'sequence'. • Explain what happens when we change the order of instructions. • Trace a sequence to make a prediction. • Test predictions by running the sequence. • Choose a series of commands that can be run as a program. • Create and debug programs that I have written. • Run a program on a device.	• 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.	• Use an indefinite loop to produce a given outcome. • Use a count-controlled loop to produce a given outcome. • List an everyday task as a set of instructions including repetition. • 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.	• Choose a condition to use in a program. • Create a condition-controlled loop. Use • a condition in an 'if... then…' statement to start an action; • selection to switch program flow; • 'if... then... else…' to switch program flow in one of two ways.	• 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 more useable (to humans). • Decide where in a program to set a variable • Update a variable with a user input – use an event in a program to do so • 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

Propositional knowledge - The concepts children will develop and understand within each unit of learning.						
	• Enact a given word • Predict the outcome of a command on a device • List that commands can be used on a given device • Explain what a given command does. • Match a command to an outcome. • Recognise how to run a command (press a button). • Choose a command for a purpose • Understand that a program is a set of commands a computer can run • Build a sequence of commands in steps. • Combine commands in a program. Recall: • words that can be enacted; • that a series of instructions can be issued before they are acted.	• Describe a series of instructions as a 'sequence'. • Recall that a series of instructions can be issued before they are enacted. • Use logical reasoning to predict the outcome of a program.	Explain: • that programs start because of an input; • what a sequence is; • that the order of commands can affect a program's output. Identify that: • a program includes sequences of commands; • the sequence of a program is a process; • different sequences can achieve the same output; • different sequences can achieve different outputs	• Relate what 'repeat' means. • Justify when to use a loop and when not to. • Recognise that not all tools enable more than one process to be run at once. To identify: • everyday tasks that include repetition as part of a sequence, eg brushing teeth, dance moves; • a loop within a program; • patterns in a sequence, eg 'step 3 times' means the same as 'step, step, step'. To explain that: • we can use a loop command in a program to repeat instructions; • in programming there are indefinite loops and count-controlled loops; • an indefinite loop will run until the program is stopped; • you can program a loop to stop after a specific number of times; • the importance of instruction order in a loop.	• Relate that a count-controlled loop contains a condition. • Compare a count controlled loop with a condition-controlled loop. Explain that: • a condition can only be true or false; • a condition-controlled loop will stop when a condition is met; • when a condition is met a loop will complete a cycle before it stops; • selection can be used to branch the flow of a program; • a loop can be used to repeatedly check whether a condition has been met; • the importance of instruction order in 'if... then... else...' statements.	Identify: • examples of information that is variable e.g. a football score during a match; • that variables can hold numbers (integers) or letters (strings). Explain that: • a variable can be used in a program, e.g. 'score; • a variable has a name and a value; • the importance of setting up a variable at the start of a program (initialisation); • there is only one value for a variable at any one time; • if you change the value of a variable, you cannot access the previous value (cannot undo); • if you read a variable, the value remains; • the name of a variable is meaningless to the computer and needs to be unique. Define: • 'variable' as something that is changeable; • a program variable as a placeholder in memory for a single value; • the way that a variable is changed. Recognise that:

		• the value of a variable can be updated and used by a program; • a variable can be set as a constant (fixed value);

DATA AND INFORMATION

	Key Stage 1		Key Stage 2			
	Year 1 and 2		**Year 3 and 4**		**Year 5 and 6**	
	1.4 Grouping data	**2.4 Pictograms**	**3.4 Branching Databases**	**4.4 Data Logging**	**5.4 Flat-file Databases**	**6.4 Introduction to Spreadsheets**
Procedural Knowledge - Skills children will develop in the computing curriculum.	• Collect simple data and show that collected data can be counted. • Identify similarities (attributes) of an object; describe properties of an object and group objects (based on commonality) to answer questions.	• Recognise that people, animals and objects can be described by attributes • Enter data onto a computer. • Use a computer to view data in different forms. • Use pictograms to answer single-attribute questions. • Use a computer to answer comparison questions (tables, graphs).	• 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	• Export information in different formats. • Choose how often to automatically collect data samples. To use: • a computer to sort data by one attribute; • a set of logged information to find information; • a digital device to collect data automatically;	• Select an appropriate graph to visually compare data • Ask questions that need more than one attribute to answer. To choose: • different ways to view data; • multiple criteria to search data to answer a given question (AND and OR); • suitable ways to present information to other people. To choose which attribute: • to sort data by to answer a given question; • and value to search by to answer a given question (operands).	• Calculate data using a formula for each operation. • Choose suitable ways to present spreadsheet data. To use: • functions to create new data; • existing cells within a formula. •

| Propositional knowledge - The concepts children will develop and understand within each unit of learning. | • Identify that objects can be counted.
• Recognise that information can be presented and in different ways. | • Compare objects that have been grouped by attribute.
• Construct (complete) a given comparison question.
• Suggest heading for tally charts and pictograms.
• Understand how some information should not be shared.

To use a:
• tally chart to collect data.
• computer program to present information in different ways. | • Investigate questions with yes/no answers.
• Identify attributes that you can ask yes/no questions about.
• Select an attribute to separate objects into two similarly sized groups.
• Recognise that a data set can be structured using yes/no questions.
• Relate two levels of a branching database using AND.
• Suggest real-world applications for branching databases.

To explain that a:
• branching database is an identification tool;
• well-structured branching database will enable you to identify objects using fewer questions. | • Suggest questions that can be answered using a table of data.
• Recognise that a sensor can be used as an input device for data collection.
• Explain that a data logger captures 'data points' from sensors over time.

To identify:
• data that can be logged over time;
• that sensors are input devices. | To explain that:
• a computer program can be used to organise data;
• tools can be used to select data to answer questions;
• computer programs can be used to compare data visually;
• we present information to communicate a message.

To outline how:
• ordering data allows us to answer some questions;
• operands can be used to filter data;
• 'AND' and 'OR' can be used to refine data selection. | • Identify questions that can be answered using spreadsheet data.
• Evaluate results in comparison to the question asked.

To explain:
• what an item of data is in a spreadsheet;
• outline that there are different software tools to work with data;
• how the data type determines how a spreadsheet can process the data;
• that formulas can be used to produce calculated data;
• why data should be organised in a spreadsheet.

To recognise
• that a cell's value automatically updates when the value in a linked cell is changed;
• cells can be linked. |