

<b>Computing</b>
<b>National Curriculum Aims</b>
<p>The national curriculum for computing aims to ensure that all pupils:</p> <ul style="list-style-type: none"> <li>• can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation</li> <li>• can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems</li> <li>• can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems</li> <li>• are responsible, competent, confident and creative users of information and communication technology.</li> </ul>
<b>Key Concepts</b>
<b>During computing cycles pupils explore the following key concepts:</b>
<ul style="list-style-type: none"> <li>• Pupils learn about how a range of technology affects our lives and how to remain safe online, ensuring their rights are respected.</li> <li>• Pupils learn how technology can represent information in a range of forms, using a variety of presentation approaches.</li> </ul>
<b>Specific knowledge within the cycles</b>
<b>Year 1/2: Cycle A</b>
<b>Online Safety &amp; Exploring Purple Mash (1.1)</b>
<p>Pupils learn how to customise their online avatar. Pupils learn how to save their work in their personal files. Pupils learn how to locate files within their work portfolio. Pupils learn how to navigate a learning platform confidently, searching for key resources they are interested in. Pupils are aware of how to log in and log out of a learning platform.</p>
<b>Effective Searching (2.5)</b>
<p>Pupils learn about key internet vocabulary. Pupils learn how to purposefully use and read a basic web search engine. Pupils learn how to create work that allow them to digitally share their knowledge of internet searching.</p>
<b>Lego Builders (1.4)</b>
<p>Pupils learn about the importance of following instructions accurately in order to achieve a desired outcome. Pupils learn about algorithms and the need for precise commands. Pupils learn how algorithms are used in order to create computer programs. Pupils learn how to logically order instructions so that a desired outcome can be achieved. Pupils learn about the importance of correcting errors in an algorithm or program, in order to 'debug'.</p>
<b>Technology Outside school (1.9)</b>
<p>Pupils learn about the range of technology available in school and out of school. Pupils learn about how technology is used in school and out of school.</p>
<b>Grouping &amp; Sorting (1.2)</b>
<p>Pupils learn how to sort items based on a specific criterion. Pupils use a range of different criteria in order to sort in different ways.</p>

<b>Creating Pictures (2.6)</b>
Pupils learn about impressionist art and how to create art influenced by this style. Pupils learn about pointillism art and how to create art influenced by this style. Pupils learn about the features of Piet Mondrian's work and how to create art based upon his style. Pupils learn about the features of art that features repeating patterns and how to create repeating patterns in a variety of ways. Pupils learn about surrealist art and how to create a collage based upon this style.
<b>Spreadsheets (1.8)</b>
Pupils learn how to navigate a spreadsheet. Pupils learn how to save, open and input data into a spreadsheet. Pupils learn how to add clipart to a spreadsheet. Pupils learn how to use spreadsheet tools in order to calculate different values. Pupils how to perform calculations using spreadsheet tools.
<b>Coding (1.7)</b>
Pupils learn about how coding is used and implemented on a computer. Pupils learn about how a block of code is used on a computer. Pupils learn how to interact with a simple program interface. Pupils learn how to create a simple program. Pupils learn about collision detection and how to input sound into their program.
<b>Coding (2.1)</b>
Pupils learn about the use algorithms and reflect on the use of algorithms they have created. Pupils begin to learn about timer and repeat commands within an algorithm. Pupils learn how to include a button within their created programs. Pupils learn how to use a design document to help debug a program. Pupils learn about the importance of regularly saving their work when changing a program. Pupils begin to learn how to predict the behaviour of a program. Pupils learn how to plan and code a program in order to achieve a desired result.
<b>Year 1/2: Cycle B</b>
<b>Online Safety &amp; Exploring Purple Mash (1.1)</b>
Pupils learn how to customise their online avatar. Pupils learn how to save their work in their personal files. Pupils learn how to locate files within their work portfolio. Pupils learn how to navigate a learning platform confidently, searching for key resources they are interested in. Pupils are aware of how to log in and log out of a learning platform.
<b>Maze Explorers (1.5)</b>
Pupils learn how to use direction keys. Pupils learn how to reverse changes they have made within a program. Pupils learn how to create and debug a simple algorithm.
<b>Questioning (2.4)</b>
Pupils learn how about the benefits and limitations of pictograms. Pupils learn about binary trees. Pupils learn how to use a simple database.
<b>Online Safety (2.2)</b>
Pupils learn how to refine search results. Pupils learn how to open and respond to an email. Pupils learn about the use of emails in everyday life. Pupils learn about the concept of a 'digital footprint' and

how they can affect their own digital footprint. Pupils learn about how they can keep their personal information secure.

### **Animated Story Books (1.6)**

Pupils learn how to create a digital image using different drawing tools. Pupils learn how to add text, change font, font size and page colour. Pupils learn how to overwrite a file when they are saving. Pupils learn how to retrieve files. Pupils learn how to add animations and sound to their stories.

### **Making Music (2.7)**

Pupils learn how to sequence different sounds in order to create a tune. Pupils learn how to change the tempo of different sounds. Pupils learn about how music can convey different emotions. Pupils learn how to upload and share their created tune.

### **Spreadsheets (2.3)**

Pupils learn about rows and columns within a spreadsheet. Pupils learn how to open, save and edit a spreadsheet. Pupils learn how to use spreadsheet tools in order to complete mathematical calculations. Pupils learn how to create a table of data. Pupils learn how to create a block graph.

### **Pictograms (1.3)**

Pupils will contribute to shared collection of class data. Pupils learn how to create a simple pictogram. Pupils learn how to use represent data using a pictogram.

### **Presenting Ideas (2.8)**

Pupils learn about how traditional tales can be represented in different digital formats. Pupils will create a quiz based on a selected topic. Pupils learn how to add photos and clipart into a publisher fact file.

## **Specific knowledge within the cycles**

### **Year 3/4: Cycle A**

#### **Unit 3.2 Online safety**

Pupils learn about the importance of a strong password when using technology. Pupils learn about how the security of their password could affect them and the differing outcomes that could occur. Pupils will contribute to a class blog, reflecting on appropriate messages that could be shared. Pupils learn how to critically evaluate the reliability of a website and consider that not all websites will contain accurate information. Pupils learn how to identify inappropriate use of technology, including cyberbullying, and the appropriate action to take.

#### **Unit 3.4 Touch Typing**

Pupils learn the name of the different rows of keys on a keyboard. Pupils learn how to start to develop the ability to touch type using both their left and right hands.

#### **Unit 3.5 Email (including email safety)**

Pupils learn about the range of methods of communications, reflecting on the advantages and disadvantages of each. Pupils learn how to open and respond to emails. Pupils learn about the ways people can stay safe when using emails. Pupils learn how to add attachment to emails and understand how to add multiple recipients.

### **Unit 3.1 Coding (Cycle A)**

Pupils learn how to design a sequential algorithm. Pupils will about the definitions of computing vocabulary; Object, Action, Output, Control and Event. Pupils learn about how computer simulate physical systems and the variables that may affect them. Pupils will how to include an 'If' statement in their program. Pupils learn how to purposefully program a character to perform a set of actions. Pupils learn how to use repeating blocks of code. Pupils learn about debugging and how to debug simple programs. Pupils learn about why it is important to regularly save their work throughout the coding process.

### **Unit 3.3 Spreadsheets**

Pupils learn how to create a table of data on a spreadsheet. Pupils learn how to create charts and graphs based on data. Pupils learn how to use mathematical symbols to aid calculations within a spreadsheet. Pupils learn about the naming system of cells within a spreadsheet and be able to find specified locations.

### **Unit 3.6 Branching Databases**

Pupils learn about the structure of a branching database, through the use of simple games. Pupils learn how to contribute/share data with others and input this into a branching database. Pupils learn how to choose topics suitable for the use of a branching database. Pupils learn how to create and debug their own branching database. Pupils learn how to save images.

### **Unit 3.7 Simulations**

Pupils learn about how computers can simulate both real and fictional scenarios. Pupils learn about the different advantages and disadvantages of simulations. Pupils learn how to test different predictions through using a simulation. Pupils learn how to evaluate simulations and consider their use in real life scenarios. Pupils learn how to evaluate a simulations' effectiveness, based on a stated purpose.

### **Unit 3.8 Graphing**

Pupils learn how to create a graph containing multiple fields. Pupils learn how to input data into a graph. Pupils learn how to share graphs they have created. Pupils learn how to present results using a range of graphical formats.

### **Year 3/4: Cycle B**

### **Unit 4.2 Online Safety**

Pupils learn about the meaning of the term 'phishing' and are aware of the existence of scam websites. Pupil learn about what a digital footprint is and how it relates to identity theft. Pupils learn about malware and that it is software that is specifically designed to disrupt, damage, or gain access to a computer. Pupils learn about screen time and how to balance it with other activities.

### **Unit 4.7 Effective Search**

Pupils learn how to structure search queries to locate specific information. Pupils learn how to use search effectively to find out information. Pupils learn how to assess whether an information source is true and reliable. Pupils learn how to can analyse the contents of a web page and look for clues about the credibility of the information.

### **Unit 4.3 Spreadsheets**

Pupils learn about formatting cells and how to use formatting tools such as the wizard to appropriately format numbers. Pupils learn about combining tools to make fun ways to explore number. Pupils learn about using data to create graphs. Pupils learn about using spreadsheets to help with budgeting and mathematics.

#### **Unit 4.1 Coding (Cycle B)**

Pupils learn how to read and understand code. Pupils learn about debugging and how variables work using if/else statements. Pupils learn how to create a program with a character that repeats actions and how to use the Repeat Until command to make characters repeat actions. Pupils learn how to program a character to respond to user keyboard input. Pupils learn about timers in games and how these relate to real-life situations. Pupils learn about simulations and why they are used.

#### **Unit 4.4 Writing for different audiences**

Pupils learn about how to present their work and how format the text to make a piece of writing fit for its audience and purpose. Pupils learn about newspaper reports and how to use incoming information to write their own report. Pupils learn about how to write a persuasive letter or poster as part of the campaign. Pupils learn about how to use criteria to judge their writing's suitability for the intended audience.

#### **Unit 4.5 Logo**

Pupils learn about what the common instructions are in Logo and how to type them. Pupils learn how to follow simple Logo instructions to create shapes on paper. Pupils learn how to write Logo instructions for a word of four letters and shapes by using the repeat function.

#### **Unit 4.6 Animation**

Pupils learn how to put together a simple animation using paper to create a flick book. Pupils learn about animation frames and how to make a simple animation. Pupils learn about layering and how to add backgrounds and sounds to animations. Pupils learn about 'stop motion' animation and used ideas from existing 'stop motion' films to recreate their own animation. Pupils learn about display boards and blogs in safe communities.

#### **Unit 4.8 Hardware Investigators**

Pupils learn about the different parts of a desktop computer. Pupils learn about the function of the different parts of a computer. Pupils learn how to create a leaflet to show the function of computer parts.

#### **Specific knowledge within the cycles**

#### **Year 5/6: Cycle A**

#### **Unit 5.1 Coding**

Pupils learn about coding vocabulary and how to sketch or storyboard to represent a program design and algorithm. Pupils learn how to the design to create a program. Pupils learn about designing and writing a program that simulates a physical system. Pupils learn about text variables and can set/change the variable values appropriately. Pupils learn about variables and create a playable, competitive game.

#### **Unit 5.2 Online Safety**

Pupils learn about thinking critically about the information that they share online both about themselves and others. Pupils learn about how to maintain secure passwords. Pupils learn about image manipulation and how images create effects which are not possibly without technology. Pupils learn about how to reference sources in their work and to search the Internet with a consideration for the reliability of the results of sources to check validity and understand the impact of incorrect information. Pupils learn how to cite all sources when researching and explain the importance of this.

#### **Unit 5.3 Spreadsheets**

Pupils learn about how to create formulae in a spreadsheet to convert different units of measure. Pupils learn about how to use spreadsheets to work out the area and perimeter of rectangles and how to use these calculations to solve real-life problems. Pupils learn about text variables and how to create formulae that use them. Pupils learn how to use a spreadsheet to plan an event and use a spreadsheet to model a real-life situation and come up with solutions that can be practically applied.

#### **Unit 5.4 Databases**

Pupils learn about the different ways to search a database in order to answer questions correctly. Pupils learn about contributing to a class database and design an avatar it. Pupils learn how to enter information into a class database. Pupils learn how to create a database around a chosen topic. Pupils learn how to add records to their database and know what a database field is and can correctly add field information. Pupils learn how to word questions so that they can be effectively answered using a search of their database.

#### **Unit 5.5 Game Creator**

Pupils learn about reviewing and analysing computer games and can describe some of the elements that make a successful game. Pupils learn how to design their own game including creating the game environment. Pupils learn how to design the setting for their game so that it fits with the selected theme.

Pupils learn how to upload images or use the drawing tools to create the walls, floor and roof. Pupils learn how to design characters for their game. Pupils learn how to personalise their game by selecting the appropriate options to maximise the playability. Pupils learn how to write informative instructions for their game so that other people can play it and then evaluate their and peers' games.

#### **Unit 5.6 3D Modelling**

Pupils learn about designing using the 2Design and Make tools. Pupils learn about the different viewpoints in 2Design and Make whilst designing a building.

Pupils learn how to adapt one of the vehicle models by moving the points to alter the shape of the vehicle while still maintaining its form. Pupils learn how to edit the polygon 3D models to design a 3D model for a purpose. Pupils learn how to refine one of their designs to prepare it for printing. Pupils learn how to print their design as a 2D net and then created a 3D model.

#### **Unit 5.7 Concept maps**

Pupils learn about making connections between thoughts and ideas and can see the importance of recording concept maps visually. Pupils learn about what is meant by 'concept maps', 'stage', 'nodes' and 'connections'. Pupils learn how to create a basic concept map to create an informative text. Pupils learn how to use 2Connect collaboratively to create a concept map. Pupils learn to use Presentation Mode to present their concept maps to an audience.

#### **Year 5/6: Cycle B**

#### **Unit 6.1 Coding**

Pupils learn how to plan a program before coding to anticipate the variables that will be required to achieve the desired effect. Pupils learn about debugging when things do not run as expected. Pupils learn about functions and how they can be created and labelled in 2Code. Pupils learn how to code programs that take text input from the user and use this in the program. Pupils learn about attribute variables to user input and are aware of the need to code for all possibilities when using user input.

#### **Unit 6.2 Online safety**

Pupils learn about risks online including sharing location, secure websites, spoof websites, phishing and other email scams. Pupils learn about the steps they can take to protect themselves including protecting their digital footprint, where to go for help, smart rules and security software. Pupils learn about what they share impacts upon themselves and upon others in the long-term. Pupils learn about the consequences of promoting inappropriate content online and how to put a stop to such behaviour when they experience it or witness it as a bystander. Pupils learn how to recognise a need to find a balance between being active and digital activities and give reasons for limiting screen time.

#### **Unit 6.3 Spreadsheets**

Pupils learn about creating a spreadsheet to answer a mathematical question relating to probability. Pupils learn how to use copy and paste shortcuts and problem solve using the count tool. Pupils learn about creating a machine to help work out the price of different items in a sale. Pupils learn how to use the formula wizard to create formulae. Pupils learn how to use a spreadsheet to solve a problem and come up with solutions that can be applied to real life.

#### **Unit 6.4 Blogging**

Pupils learn about how a blog can be used as an informative text. Pupils learn about the key features of a blog and how to work collaboratively to plan a blog. Pupils learn how to create a blog with a specific purpose and that the way in which information is presented has an impact upon the audience. Pupils learn that blogs need to be updated regularly to maintain the audience's interest and engagement. Pupils learn how to post comments and blog posts to an existing class blog. Pupils learn about the approval process that their posts go through and demonstrate an awareness of the issues surrounding inappropriate posts and cyberbullying.

#### **Unit 6.5 Text Adventures**

Pupils learn how to map out a story-based text adventure. Pupils learn how to create, test and debug using their plan. Pupils learn about mapping out existing text adventures. Pupils learn how to contrast a map-based game with a sequential story-based game. Pupils learn how to use coding concepts of functions, two-way selection (if/else statements) and repetition in conjunction with one another to code their game. Pupils learn how to make logical attempts to debug their code when it does not work correctly.

#### **Unit 6.6 Networks**

Pupils learn about the difference between the World Wide Web and the internet. Pupils learn about what a LAN and a WAN are. Pupils learn about their school network. Pupils learn about Tim Berners-Lee and consider some of the major changes in technology which have taken place during their lifetime and the lifetime of their teacher/another adult.

#### **Unit 6.7 Quizzing**

Pupils learn about picture-based quizzes and how to consider the audience's ability level and interests when setting the quiz. Pupils learn about different question types and have ideas about what sort of questions are best suited to the different question types. Pupils learn about sharing quizzes

with their peers, give and respond to feedback. Pupils learn about quizzes on television and use their knowledge of quiz types to create a quiz show quiz based on a curriculum area.

### Unit 6.7 Binary (Optional)

Pupils learn about types of data using number codes, that ultimately are patterns of 1s and 0s (called binary digits, which is why they are called digital systems). Pupils learn about binary representations and that these represent the on and off electrical states respectively in hardware and robotics. Pupils learn how to explain that all data in a computer is saved in the computer memory in a binary format. Pupils learn how to count up from 0 in binary. Pupils learn how to convert numbers to binary using the division by two methods.

### Deepening Understanding

- Understand the importance of precision and accuracy within an algorithm, being able to achieve a specified outcome when programming.
- Ability to retrieve key information, using an effective and safe approach, and evaluate its validity.
- Pupils are able to safely communicate their ideas and share work systematically.
- Able to accurately and confidently use computer terminology.

### Year Group Learning Expectations

Year 1	<ul style="list-style-type: none"> <li>• create a series of instructions and plan a journey for a programmable toy</li> <li>• create, store and retrieve digital content</li> <li>• use a website and a camera</li> <li>• record sound and play back</li> <li>• talk about some of the IT uses in their own home</li> <li>• use technology safely</li> <li>• keep personal information private</li> </ul>
Year 2	<ul style="list-style-type: none"> <li>• understand that algorithms are used on digital devices</li> <li>• write a simple program and test it</li> <li>• predict what the outcome of a simple program will be (logical reasoning).</li> <li>• understand that programs require precise instructions</li> <li>• organise, retrieve and manipulate digital content</li> <li>• know how technology is used in school and outside of school</li> <li>• know where to go for help if concerned.</li> </ul>
Year 3	<ul style="list-style-type: none"> <li>• write programs that accomplish specific goals</li> <li>• design a sequence of instructions, including directional instructions</li> <li>• discern when it is best to use technology and where it adds little or no value</li> <li>• navigate the web to complete simple searches</li> <li>• use a range of software for similar purposes</li> <li>• collect and present information</li> <li>• understand what computer networks do and how they provide multiple services</li> <li>• use technology respectfully and responsibly</li> <li>• Know different ways they can get help, if concerned</li> </ul>
Year 4	<ul style="list-style-type: none"> <li>• give an 'on-screen' robot specific instruction that takes them from A to B</li> <li>• experiment with variables to control models</li> <li>• make an accurate prediction and explain why they believe something will happen (linked to programming)</li> <li>• know how to search for specific information and know which information is useful and which is not</li> <li>• select and use software to accomplish given goals</li> <li>• produce and upload a podcast</li> </ul>



	<ul style="list-style-type: none"> <li>recognise acceptable and unacceptable behaviour using technology</li> </ul>
Year 5	<ul style="list-style-type: none"> <li>use technology to control an external device</li> <li>develop a program that has specific variables identified</li> <li>analyse and evaluate information reaching a conclusion that helps with future developments</li> <li>understand how search results are selected and ranked</li> <li>combine sequences of instructions and procedures to turn devices on and off</li> <li>understand that they have to make choices when using technology and that not everything is true and/or safe</li> </ul>
Year 6	<ul style="list-style-type: none"> <li>write a program that combines more than one attribute</li> <li>develop a sequenced program that has repetition and variables identified</li> <li>design algorithms that use repetition and 2-way selection</li> <li>be aware that some search engines may provide misleading information</li> <li>present the data collected in a way that makes it easy for others to understand</li> <li>Be increasingly aware of the potential dangers in using aspects of IT and know when to alert someone if feeling uncomfortable</li> </ul>