



# THE BOWLAND FEDERATION OF SCHOOLS

## COMPUTING CURRICULUM NARRATIVE UKS2



### THE NATIONAL CURRICULUM

#### **Purpose of study**

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

**Aims** The national curriculum for computing aims to ensure that all pupils:

- ♣ can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- ♣ can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- ♣ can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- ♣ are responsible, competent, confident and creative users of information and communication technology.

#### **Key Stage 2** Pupils should be taught to:

- ♣ design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- ♣ use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- ♣ use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- ♣ understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- ♣ use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- ♣ select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
- ♣ use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

### TEN COMPUTING STRANDS

ALGORITHMS	COMPUTER NETWORKS	COMPUTER SYSTEMS	CREATING MEDIA	DATA AND INFORMATION
Be able to comprehend, design, create, and evaluate algorithms	Understand how networks can be used to retrieve and share information, and how they come with associated risks	Understand what a computer is, and how its constituent parts function together as a whole	Select and create a range of media including text, images, sounds, and video	Understand how data is stored, organised, and used to represent real-world artefacts and scenarios
DESIGN AND DEVELOPMENT	EFFECTIVE USE OF TOOLS	IMPACT OF TECHNOLOGY	PROGRAMMING	SAFETY AND SECURITY
Understand the activities involved in planning, creating, and evaluating computing artefacts	Use software tools to support computing work	Understand how individuals, systems, and society as a whole interact with computer systems	Create software to allow computers to solve problems	Understand risks when using technology, and how to protect individuals and systems

UPPER KEY STAGE 2 TOPICS			
TITLE	COMPUTING SYSTEMS AND NETWORKS	CREATING MEDIA	PROGRAMMING A
CONCEPT	<p>Systems and searching - Recognising IT systems in the world and how some can enable searching on the internet.</p> <p>Communication and collaboration - Exploring how data is transferred by working collaboratively online.</p>	<p>Video production - Planning, capturing, and editing video to produce a short film.</p> <p>Webpage creation - Designing and creating webpages, giving consideration to copyright, aesthetics, and navigation.</p>	<p>Selection in physical computing - Exploring conditions and selection using a programmable microcontroller.</p> <p>Variables in games - Exploring variables when designing and coding a game.</p>
BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	<p>To explain that computers can be connected together to form systems. Can I describe the input, process, and output of a digital system? To recognise the role of computer systems in our lives. To identify how to use a search engine. To describe how search engines select results. Can I recognise the role of web crawlers in creating an index? To explain how search results are ranked. Can I explain how search engines make money?</p> <p>To explain the importance of internet addresses. To recognise how data is transferred across the internet. Can I explain that all data transferred over the internet is in packets? To explain how sharing information online can help people to work together. Can I explain that the internet allows different media to be shared? Can I explain how the internet enables effective collaboration? To recognise how we communicate using technology. To evaluate different methods of online communication.</p>	<p>Can I compare features in different videos? To use a digital device to record video. Can I experiment with different camera angles? To capture video using a range of techniques. To create a storyboard. To identify that video can be improved through reshooting and editing. Can I store, retrieve, and export my recording to a computer? To consider the impact of the choices made when making and sharing a video. Can I evaluate my video and share my opinions?</p> <p>To review an existing website and consider its structure. Do I know that websites are written in HTML? To plan the features of a web page. To consider the ownership and use of images (copyright) Can I describe what is meant by the term 'fair use'? To recognise the need to preview pages. To outline the need for a navigation path Can I make multiple web pages and link them using hyperlinks? To recognise the implications of linking to content owned by other people.</p>	<p>To control a simple circuit connected to a computer. Can I explain what an infinite loop does? To write a program that includes count-controlled loops. To explain that a loop can stop when a condition is met. Can I program a microcontroller to respond to an input? To explain that a loop can be used to repeatedly check whether a condition has been met. Can I use selection (an 'if...then...' statement) to direct the flow of a program? To design a physical project that includes selection. To create a program that controls a physical computing project.</p> <p>To define a 'variable' as something that is changeable. To explain why a variable is used in a program. Can I identify a program variable as a placeholder in memory for a single value? Can I recognise that the value of a variable can be changed? To choose how to improve a game by using variables. To design a project that builds on a given example. To use my design to create a project. Can I create the artwork for my project? Can I test the code that I have written? To evaluate my project.</p>

VOCABULARY	<p><b>High Frequency VOCABULARY</b></p> <p>Search - Refine - Selection Ordering - Ranking</p> <p>Chat - Explore Reuse - Remix - Collaboration Public - Private - One-way - Two-way - One-to-one - One-to-many</p>	<p><b>Subject Specific VOCABULARY</b></p> <p>System - Connection Digital - Input - Process Output Search Engine Index - Crawler - Bot Links - Algorithm - Search Engine Optimisation (SEO) Content Creator</p> <p>Communication - Protocol - Data - Address - Internet Protocol (IP) address - Domain Name Server (DNS) Packet - Header - Data payload - Slide deck</p>	<p><b>High Frequency VOCABULARY</b></p> <p>Video - Audio - Camera - Close up - Microphone - Lens - Static camera Storyboard Filming - Review - Delete - Reorder - Evaluate - Share</p> <p>Logo - Layout - Header - Purpose - Preview - Evaluate - Device - Implication - Embed</p>	<p><b>Subject Specific VOCABULARY</b></p> <p>Talking head - Panning, - Mid range - Long shot - Moving subject - Side by side - High angle - Low angle - Normal angle Zoom - Pan - Tilt Import - Export - Split - Trim - Clip - Edit - Reshoot</p> <p>Website - Web page - Browser - Media Hypertext Markup Language (HTML) Copyright - Fair use Home page - Google Sites Breadcrumb trail - Navigation - Hyperlink - Subpage - External link</p>	<p><b>High Frequency VOCABULARY</b></p> <p>Change- Name - Design - Event - Task - Artwork - Project Improve - Evaluate - Share</p>	<p><b>Subject Specific VOCABULARY</b></p> <p>Microcontroller - Components - Connection - Infinite loop Output component - Motor - Repetition - Count-controlled loop Crumble controller - Components - Switch - LED - Sparkle - Crocodile clips - Connect - Battery box - Program - Condition Input - Output - Selection - Action - Repetition - Debug</p> <p>Variable - Value - Set Algorithm - Code - Program Test - Debug</p>

TITLE	DATA AND INFORMATION	CREATING MEDIA	PROGRAMMING B
CONCEPT	<p>Flat-file databases - Using a database to order data and create charts to answer questions.</p> <p>Introduction to spreadsheets - Answering questions by using spreadsheets to organise and calculate data.</p>	<p>Introduction to vector graphics - Creating images in a drawing program by using layers and groups of objects.</p> <p>3D modelling - Planning, developing, and evaluating 3D computer models of physical objects.</p>	<p>Selection in quizzes - Exploring selection in programming to design and code an interactive quiz.</p> <p>Sensing movement - Designing and coding a project that captures inputs from a physical device.</p>

BIG IDEAS/KEY QUESTIONS/LEARNING FOCUS	<p>To use a form to record information. To compare paper and computer-based databases Can I navigate a flat-file database to compare different views of information? Can I choose which field to sort data by to answer a given question? To outline how you can answer questions by grouping and then sorting data. To explain that tools can be used to select specific data Can I choose which field and value are required to answer a given question? To explain that computer programs can be used to compare data visually. To use a real-world database to answer questions.</p> <p>To create a data set in a spreadsheet. To build a data set in a spreadsheet. To explain that formulas can be used to produce calculated data Can I construct a formula in a spreadsheet? To apply formulas to data Can I create a formula which includes a range of cells? To create a spreadsheet to plan an event. To choose suitable ways to present data. Can I suggest when to use a table or chart?</p>		<p>To identify that drawing tools can be used to produce different outcomes. Can I discuss how vector drawings are different from paper-based drawings? To create a vector drawing by combining shapes. Can I move, resize, and rotate objects I have duplicated? Can I use the zoom tool to help me add detail to my drawings? Can I explain how alignment grids and resize handles can be used to improve consistency? To recognise that vector drawings consist of layers. To group objects making them easier to work with. Can I create a vector drawing for a specific purpose?</p> <p>To recognise that you can work in three dimensions on a computer. To identify that digital 3D objects can be modified by resizing, lifting/lowering and recolouring. To recognise that objects can be combined in a 3D model by rotating, duplicating and grouping. To create a 3D model for a given purpose. To plan my own 3D model. To create my own digital 3D model.</p>		<p>To explain how selection is used in computer programs. Can I recall, identify and modify a condition in a program? To relate that a conditional statement connects a condition to an outcome. Can I use selection in an infinite loop to check a condition? Can I identify the condition and outcomes in an 'if... then... else...' statement? To design, create and evaluate a program that uses selection.</p> <p>To create a program to run on a controllable device To explain that selection can control the flow of a program Can I use a variable in an if, then, else statement to select the flow of a program? To update a variable with a user input. To use a conditional statement to compare a variable to a value Can I use an operand (e.g. &lt;=&gt;) in an if, then statement? To design and develop a project that uses inputs and outputs on a controllable device.</p>	
	VOCABULARY	<p><b>High Frequency VOCABULARY</b></p> <p>Information – Record – Field – Sort – Order – Group – Search - Criteria Graph – Chart – Axis Compare – Filter - Presentation</p> <p>Collecting – Table – Structure - Format Calculation – Duplicate Propose – Question - Organised Chart – Evaluate – Results - Comparison</p>	<p><b>Subject Specific VOCABULARY</b></p> <p>Database – Data - Value Spreadsheet – Cell - Cell reference - Data item Formula – Input – Output – Operation – Range – Sigma - Data set – Software - Tools</p>	<p><b>High Frequency VOCABULARY</b></p> <p>Move – Resize – Colour – Rotate - Duplicate/copy Zoom – Select – Align - Modify Reflection</p> <p>2D - 3D – Shapes – Select – Move – Perspective - View Handles– Lift – Lower Rotate – Duplicate - Cylinder – Placeholder - Hollow Choose - Combine Construct -Evaluate - Modify</p>	<p><b>Subject Specific VOCABULARY</b></p> <p>Vector - Drawing tools – Object - Toolbar Layers - Order Copy – Paste – Group – Ungroup - Vector drawing - Reuse</p>	<p><b>High Frequency VOCABULARY</b></p> <p>True - False Outcomes - Conditional statement (the linking together of a condition and outcomes) Question - Answer Task – Design - Input Implement – Test – Run - Setup</p> <p>Sensing – Accelerometer - Value Compass – Direction - Navigation Design – Task - Step counter Plan - Create</p>

