Co-op Academy Belle Vue

Co-op Belle Vue Computer Science 3 year overview

The Key Stage 3 curriculum at BelleVue emphasises the development of both procedural and declarative knowledge in the realms of digital literacy, ICT, and computer science. Students not only learn practical skills and procedures, known as procedural knowledge, such as how to use software applications, write code, and secure networks, but they also acquire conceptual understanding and theoretical knowledge, known as declarative knowledge, about the underlying principles and concepts in technology.

As students engage with various topics, such as hardware components, data representation, programming, and cyber security, they not only learn the step-by-step procedures for performing tasks but also gain a deeper understanding of the principles and theories behind those tasks. For example, while learning programming essentials and Python programming with sequences of data, students not only learn how to write code and solve problems procedurally but also develop a conceptual understanding of algorithms, data structures, and programming paradigms, enriching their declarative knowledge.

Similarly, as students explore topics like network fundamentals, cyber security threats, and data science techniques, they not only learn practical procedures for securing networks and analysing data but also gain a conceptual understanding of network protocols, encryption methods, and statistical algorithms, deepening their declarative knowledge in these areas.

By integrating both procedural and declarative knowledge throughout the curriculum, we ensure that students not only acquire practical skills for using technology but also develop a strong foundation of conceptual understanding, empowering them to apply their knowledge in real-world scenarios, think critically about technology issues, and adapt to new technologies and challenges in the future.

<u>Core Concepts</u>

- Digital literacy: the 'skills and knowledge required to be an effective, safe and discerning user of a range of computer systems' It covers a range of knowledge and skills, such as using physical devices or knowledge of the features that are likely to mean digital content is reliable.
- Information communication technology: provides a context for the use of computers in society. It focuses on how computers are used in different sectors. 2 content areas of information technology: digital artefacts and computing contexts. Digital artefacts are digital objects created by humans. Knowledge of computing contexts chronicles the history of the discipline and explains how computing is used in the modern world.
- Computer science covers knowledge of computers and computation, including concepts such as data, system architecture, algorithms and programming.

Year 7 Long Term Plan -					
HT1	HT2	HT3	HT4	HT5	HT6
Topic 1		Topic 2		Topic 3	
Hardware Components that make up a Computer System		Introduction to Data Representation		Networking	
Key concepts		Key concepts		Key concepts	
Computer Science Includes: Input Process Output Hardware and Software Identifying device function Inside the computer		Computer Science Include: Representing Numbers and Text using Binary Digits Binary Denary Conversion File size calculation		Computer Science Includes: Networks & Communication A network connects computers. A stand-alone computer works alone. Protocols = rules computers follow to send messages. Messages travel through many devices (like letters through post offices). Network Hardware Cable – connects devices. Hub – sends data to all devices. Switch – sends data only to the right device. Server – stores shared files. Router – connects to the internet. ISP – company that gives internet access. Wired, Wireless & Bandwidth Wired = cables (fast, secure). Wireless = radio waves (WiFi, Bluetooth). Network Topologies (Layouts) Ring – one break stops everything.	

		Bus – one cable for all devices. Star – all devices linked to 1 centre point. Mesh – devices link to many others.
Assessment: How can I use images to show how various hardware and software components of a computer work together to store, process, and manage data? Identify if hardware is input or output. Identity if products are hardware or software. Be able to select if hardware is interval devices or external devices.	Assessment: How do we convert a Binary Number into a Denary Number so we can understand it?How do we convert a Denary Number, that we understand, into a Binary number that the computer understands?	Assessment: Draw and describe network topologies Be able to select the most suitable network for a scenario. Be able to select hardware needed to create different networks.

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Year 8 Long Term Plan -					
HT1	HT2	HT3	HT4	HT5	HT6
Topic 1		Topic 2		Topic 3	
Topic :Programming Essentials II		Topic: Modelling data using spreadsheets		Topic: App Development	
Key concepts		Key concepts		Key concepts	
Includes: Complexity Control Subroutines Decomposition Lists		Includes: Columns Rows Cells Cell referencing Formatting Formula / Functions Data and Information Primary and Secondary Sources Analysis of data Conditional Formatting		Include: User-Centred Design Wireframing App Features Online Safety & Ethics	
Assessment: Pupils can analyse code and describe what will happen when run, using the PRIMM model. Be able to identify what will happen next in the list and what variables are needed. Pupils will be able to create a quiz with correct and incorrect answers with a range of output messages.		Assessment: Application of SS Skills to solve a problem. Pupils will be able to adapt the column row and add formatting to the spreadsheet. They will be able to use a range of formulas and functions to create a functioning spreadsheet.		Assessment: "How can we use the app development process and tools to create an effective Health and Fitness Tracker app while collaborating with peers to improve and refine our work?" Pupils will understand how to be safe online and protect themselves from harm. Pupils will decide which design principles to include on their designs.	

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Year 9 Long Term Plan -					
HT1	HT2	HT3	HT4	HT5	HT6
Topic 1		Topic 2		Topic 3	
Topic : Data Analysis		Topic: Graphics		Topic: Python Programming	
Key concepts		Key concepts		Key concepts	
What Data Science Is Data Visualisation Large and Global Data Sets Correlation and Outliers The Investigative Cycle (PPDAC) Data Collection and Capture Data Cleansing		Includes: Vector graphics How vector and bitmap images are created Advantages and disadvantages of vector and bitmap images Bitmap graphics Compression types and why they are used Photopea skills to create media products. Design principles and media product conventions.		Algorithms & Basic Python Algorithms = step-by-step instructions. Programs follow strict rules (syntax). Python needs correct spelling and layout. Use print(), input(), and variables. Variables & Arithmetic Variables store changing values. Python can do maths: + - * / // % ** Input must sometimes be changed into numbers. You must assign a variable before using it. Selection & Randomness Programs can make decisions using if statements. Conditions use comparison: ==, >, <, etc. Boolean logic: True/False. The random module creates random numbers. Iteration (Loops) While loops repeat code.	

		Conditions control when loops stop. Variables can be used as counters. Correct indentation is essential. Variables, Constants & Data Types Variables can change; constants stay the same. Data types: Integer (whole number) Float (decimal) String (text) Boolean (True/False) Logic errors: program runs but does the wrong thing. Use iterative testing: fix small parts often. Debugging makes programs work correctly.
Assessment: Pupils will be able to analyse data and make predictions. Create and analyse data using a spreadsheet. Pupils will be able to create a range of graphs.	Assessment: Identity if images are vector or bitmap graphics. Be able to select the advantages or disadvantages of vector or bitmap graphics. Pupils will use photopea to create a suitable canvas size, use a range of tools to create media products.	Assessment: "How can we utilise user input, data type conversion, and string manipulation to create an interactive quiz in Python?" Pupils will be able to use the PRIMM model to predict what the code will do. Use of input, variables, data types, variables to create code that will output information.