East Midlands Academy Trust
Computing Curriculum Map

	YEAR 7	YEAR 8	YEAR 9	YEAR 10	YEAR 11	YEAR 12	YEAR 13
KNOWING ABOUT COMPUTERS	Binary numbers Input / Output devices Networks Internet Packets and Packet Sharing Network Errors and data loss Encryption and simple ciphers Public Key Encryption Hardware and Software Hardware control through software solution	Ethical issues around computing - waste - environmental impact - recycling and right to repair - creative commons and copyright - tracking and data mining Input and Output devices Networks Physical computer systems (CCTV & Alarms) Boolean Logic Understanding software as a designed solution Command Line Interface (CLI) vs Graphic User Interface (GUI)	Creative Commons licensing and copyright Complex Google search History of gaming hardware development - Processors - RAM - ROM - Storage - Graphics Cards - Input / Output devices - Network connectivity History of games software development Control sequences CLI / GUI interfaces Character sets and ASCII	Systems Architecture - The CPU - Von Neumann Architecture - Stored program computing Memory - RAM, ROM and V-RAM - Cache Storage - Need for storage, types and evaluation of each Data Representation - Number (binary / hex / denary) - Character sets (ASCII & Unicode) - Storing Images - Storing Sound - Compression	Networks (wired and wireless) - Types and topologies - Hardware requirements - the Internet and Cloud computing - Networking Protocols - Layers and packet switching System Security - Types of vulnerability - Identifying and mitigating risk System Software - Operating Systems - Utility Software - Software paradigms Ethical, Legal, Cultural, environmental issues	Components of a CPU - Types, components and performance - Input / Output / storage - Types of processors Data Types and Structures - Primitives and data representation - Characters sets (ASCII and Unicode) - Binary arithmetic - Floating point numbers Abstract Data Structures - Stacks / Queues / Arrays / Lists / Trees / Hash tables	Software and Operating Systems - Types and purposes of operating systems - The nature of applications Networks and the Internet - Network security and threats - Search Engine Indexing - Client-Server networks - Peer to peer networks - Networking standards - Network communication protocols Ethical, Legal, Cultural, environmental issues - Privacy - Censorship - Legislation
USING COMPUTERS	Introduction to school computer system Importance of saving / file organisation Introduction to Cloud computing / SaaS for O365 applications Touch Typing Breaking Encryption through application of mathematical models Presenting information for a specific audience Creating a digital vector graphic Storing Data (spreadsheets and databases) Querying data sets (Excel and SQL) Sending messages Using IDEs	Recap school computer system boot camp 0365 applications Touch typing Creating, researching and presenting using PowerPoint Digital design of a physical shop IT system Education as defence against human error leading to data loss (people as weak point) Designing logical systems using Flowgal CLI and text input systems GUI interface systems Production of mock-ups using presentation software (advanced PowerPoint) and house styles	Advanced Google search sifting and sorting research information Referencing and source tables Planning a professional presentation Writing to inform Giving Multimedia presentations Creating digital artwork /character design playtesting as a process Planning for complex systems using digital technology Time management through software solutions / AGILE development Iterative development Touch typing	Designing programs using flow diagrams and pseudocode Using IDEs Creating professional presentations	Databases for storing and querying datasets SQL as add-on language Translators conceptual understanding of IDEs Compilers Run Time Environments	Software Design Processes - Waterfall / Agile / Rapid / Spiral - Use of Integrated Development Environments - Git repository and version control - Stakeholder presentation - Professional documentation production	Databases and data storage - Relational Databases - Database normalisation - Transaction Processing Complete personal Project completion, including professional documentation and client / stakeholder presentation Planning for Maintenance
COMPUTATIONAL THINKING	Applying computational models to problems Applying logic to data searching Encryption as an algorithm Abstraction Decomposition End Frist Algorithmic design Program Control Designing using flow-diagrams Implementation and testing of an algorithmic solution	Input/Output system design Dealing with data Boolean Logic Building logical programs Abstraction Decomposition Program Control Flow diagrams Pseudocode CLI design (menus) implementing Logic Algorithm design Functional design variables and user input read from and saving to external files Testing and designing for testing Navigational Logic in website design	Logic in search Designing for testing / focussed testing Game design using decision trees and flow diagrams for game logic Sequence / Selection / Iteration Variables Functions Procedural creation of ASCII graphics input sanitisation Logic in application Flow Diagrams Pseudocode Iterative AGILE development Testing Peer review	Computational Logic - AND / OR / NOT - Truth tables and logic diagrams - Mathematical operations	Algorithms Computational Thinking - Abstraction - Decomposition - End-First design Searching Algorithms - Linear Search - Binary Search Sorting Algorithms - Bubble sort - Merge Sort - Insertion Sort	Computational Logic - AND / OR / NOT / NOR / XOR / NAND - Truth tables and logic diagrams - Mathematical operations - Boolean Algebra - Boolean Simplifications - Karnaugh Maps - Half and Full Adder Circuits - D-type Flip Flops and timing circuits Computational Thinking - Abstraction - Decomposition - End-First design - Programming Paradigms - Problem Recognition - Recursion	Data Exchange - Compression - Encryption - Hashing Searching Algorithms - Linear Search - Binary Search - Recursive Search - Binary Tree traversal Sorting Algorithms - Bubble sort - Merge Sort - Insertion Sort - Quick Sort Algorithm complexity ('Big O') Algorithm Optimisation
PROGRAMMING	SQL Blockly / Scratch block-based programming language Flow Diagrams	Python (CLI) Flow Diagrams Pseudocode Event Driven programming (at conceptual level) Iterative Development cycle	Python (CLI with ASCII GUI) Flow diagrams Pseudocode Input driven programming Functional program design Planning for testing	ADVANCED PYTHON Programming Techniques - Variables, operators, input, output and assignment - Selection / Sequence / Iteration - String manipulation - Basic File handling for persistence - Functional Program design - Introduction to GUI programming Producing Robust Programs - Defensive Design - Input sanitisation - Anticipating misuse - Planning for Testing - Comments and Documentation - Syntax and Logic errors	ADVANCED SQL and ADVANCED Python The use of records and databases to store and organise data SQL for database querying Solving problems using two-dimensional arrays	JAVA and Assembly basics Programming Techniques - Variables, operators, input, output and assignment - Selection / Sequence / Iteration - String manipulation - Basic File handling for persistence - Functional Program design - Introduction to GUI programming - OOP and Class based design Producing Robust Programs - Defensive Design - Input sanitisation - Anticipating misuse - Planning for Testing - Comments and Documentation Syntax and Logic errors	LANGUAGE – JavaScript / SQL HTML and CSS JavaScript and web forms SQL Completion of personal Project - Java Flow diagrams Pseudocode Professional Testing based design Iterative development

Every child deserves to be the best they can be