



Attainment in Computing at Blessed Edward Oldcorne Catholic College

The Attainment grade descriptors:

Emerging - The student is just beginning to learn/understand subject content/skills

Developing - The student is showing an increased understanding/skill level in the subject

Secure - The student has achieved a sound understanding and competence in the subject

Excelling - The student shows evidence of a deeper understanding/higher skill level in the subject and can make connections between different areas within the subject

KS3 Computing Programme of Study is divided into 3 strands: *Computer Science, Information Technology and Digital Literacy*

KS3	
CS	<p>Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems</p> <p>Understand several key algorithms that reflect computational thinking [for example, algorithms for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem</p> <p>Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions</p> <p>Understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]</p> <p>Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems</p> <p>Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits</p>
IT	<p>Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users</p> <p>Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability</p>
DL	<p>Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns</p>



Strand 1: Computer Science – Algorithms & Computer Programming (Graphical Based – MakeCode Arcade)	
I/They can....	
Emerging	Recognise algorithms (sets of instructions) used in everyday life. Create sequenced programs that execute. Identify errors in a simple program.
Developing	Create simple algorithms with inputs and outputs. Define the term 'algorithm'. Create sequenced programs, also using iteration (loops). Identify and correct simple errors i.e. debugging programs with some support.
Secure	Create algorithms using selection (if, then else) and iteration i.e. repeating code. Decompose a problem and create programs that are sequenced, use iteration (e.g. repeat until) and selection (if, then and else). Declare and assigns variables within programs. Debug programs with limited support.
Excelling	Explain and refine algorithms confidently. Design a program to solve a problem using efficient methods such as 'nested' selection and iteration. Independently debug programs so they meet desired outcomes.
Strand 1: Computer Science – Data and Data Representation	
I/They can....	
Emerging	Understand that computers use binary. Convert decimal numbers (up to 15) into binary and vice versa with support. Understand the smallest unit of measurement in a computer is a binary digit i.e. 0 or 1. Identify a chip as either being RAM or ROM with help. Recognise the name of storage devices.
Developing	Understand that humans use decimal and computers use binary. Convert decimal numbers (up to 15) into binary and vice versa independently. Correctly order units of measurement from smallest to largest with support. Identifies RAM and ROM within a computer. Understand that storage devices are either magnetic, optical or solid state.
Secure	Convert decimal numbers (up to 255) into binary and vice versa. Describe why computers use binary (transistors). State the number system used by computers and humans Correctly order units of measurement from smallest to largest (bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte & petabyte) State what binary numbers can be used to represent e.g. decimal numbers and colours (0-Black, 1 – White). Describe the purpose of RAM and ROM and which memory is volatile/non-volatile.



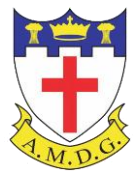
	<p>Accurately classify storage devices according to their type (magnetic, optical & solid state)</p> <p>Identify characteristics of secondary storage that can be considered as either an advantage or disadvantage (capacity, cost, portability, durability & reliability).</p>
Excelling	<p>Explain the connection between transistors (states) and binary. 0 – electricity is not flowing, 1 – electricity is flowing.</p> <p>Suggest what can be stored as bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte & petabyte.</p> <p>Describe the primary storage of a computer as either being RAM/ROM with secondary storage being HDD.</p> <p>Understand how memory and storage can affect the performance of a computer.</p> <p>Evaluate secondary storage devices based on (use, capacity, cost, portability, durability & reliability).</p>
<p>Strand 1: Computer Science – Hardware and Software I/They can....</p>	
Emerging	<p>Identify types of computers (desktop, tablet, laptop & embedded).</p> <p>Recognise peripherals as either an input or output device with support.</p>
Developing	<p>Identify different types of computers for alternative purposes (i.e. tablet if on the move).</p> <p>Identify embedded computers used in everyday life.</p> <p>Independently identify peripherals as either an input or output device.</p>
Secure	<p>Describe the purpose of internal components of a computer (motherboard, cpu, hdd, expansion cards).</p> <p>Define what is meant by a 'computer' and 'embedded' computer.</p> <p>Explain the difference between an input and output device and understand their role within a computer system.</p>
Excelling	<p>Explain the 4-box model that modern computers use (input, processing, storage & output).</p> <p>Describe tasks carried out by general purpose and embedded computers.</p> <p>Recommend input and output devices to aid users with impairments (physical & visual).</p>
<p>Strand 2: Information Technology I/They can....</p>	
Emerging	<p>Write a simple letter in word processing software with limited formatting applied.</p> <p>Understand that a spreadsheet consists of cells.</p> <p>Apply basic formatting to a spreadsheet by changing the font style, size, emphasis i.e. bold/italic. Some tools may be incorrectly used.</p> <p>Create simple formula with help to perform addition and subtraction.</p> <p>Understand that data needs to be organised so it can be found quickly.</p> <p>Sort a spreadsheet using A-Z (smallest to largest) and Z-A (largest to smallest) on one column.</p>
Developing	<p>Write a letter with a range of formatting to enhance the presentation.</p> <p>Identify cells by their cell reference e.g. A1.</p> <p>Format a spreadsheet using a range of techniques (including adjust columns & rows), with some elements being used appropriately.</p> <p>Create simple formula to perform calculations (addition, subtraction, multiplication & division)</p> <p>Filter using multiple criteria.</p>



Secure	<p>Write a letter that is formatted so that it is fit for both the intended purpose and audience.</p> <p>Describe the purpose of spreadsheets (calculations, modelling & charts to).</p> <p>Format a spreadsheet using a range of skills (text, borders, data types) so that is suitable for the intended purpose and audience.</p> <p>Use autofill and relative cell referencing in calculations whilst applying the rules of BODMAS.</p> <p>Create calculations using functions (min, max, average, sum).</p> <p>Filter using number filters (greater than or equal to).</p>
Excelling	<p>Evaluate the effectiveness of word processing and spreadsheet software for a given application.</p> <p>Format a spreadsheet using advanced techniques.</p> <p>Describe the difference between a formula and function.</p> <p>Explain the difference between relative and absolute cell referencing (\$).</p> <p>Apply conditional formatting to a spreadsheet by determining rules.</p>
<p>Strand 3: Digital Literacy</p>	
I/They can....	<p>*All students know to report concerns to the College DSL Miss Mason and Safeguarding Team</p>
Emerging	<p>Understand how to access the College Network and Google suite (Google Mail/Google Drive/Google Classroom) with support.</p> <p>Understand the need for passwords.</p> <p>Send text-based emails to one or more recipients.</p> <p>Know common uses of information technology beyond the classroom.</p> <p>Recognise a limited ways to use technology safely in/out of college. Know who to report concerns to.</p> <p>Identify types of malware and show a basic understanding of what they do.</p>
Developing	<p>Independently accesses and uses the College network, Google suite and application software (Word/Excel/PowerPoint).</p> <p>Create folders on their user area to organise their work.</p> <p>Select a strong password for the college network.</p> <p>Send emails that include text and attachments to multiple recipients. Show some awareness of phishing emails.</p> <p>Type using all fingers and thumbs spread across the keyboard to input text.</p> <p>Describe some of the dangers online, how to stay safe and who to report concerns to.</p> <p>Identify types of malware and some methods to protect against specific types, with some support.</p>
Secure	<p>Organise work both on user areas accessed in the College and the Cloud.</p> <p>Touch type a range of words on a keyboard.</p> <p>Describe why strong passwords are important.</p> <p>Describe a range of techniques to stay safe online, their responsibilities and reporting methods both in/out of college.</p> <p>Communicate via e-mail and use appropriate netiquette. Understand the signs of phishing emails and appropriate actions to take.</p> <p>Confidently describe how malicious software infects computers systems and can discuss a range of protection measures.</p>
Excelling	<p>Touch type confidently most words on a keyboard.</p> <p>Describe the advantages and disadvantages of using email as a communication medium.</p> <p>Explain why privacy is a concern online and of the ethical issues that the Internet poses (cyberbullying and online grooming).</p>



	<p>Understand the term 'digital footprint' and its impact on individuals. Discuss people as the weak point in network security and understand the hardware/software that can be used to protect networks.</p>
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Strand 1: Computer Science – Algorithms & Computer Programming (Text-based – Python) I/They can....	
Emerging	Understand that sorting algorithms help to organise data. Create a simple program that uses syntax in a sequence and identify errors that stop the program from executing.
Developing	Carry out a bubble sort on ordered data with help. Create programs that use sequence and selection with support. Debug simple syntax errors.
Secure	Describe and apply a bubble sort to a given data set independently. Understand the benefit of sorting algorithms and identify where they are used. Create programs that uses sequences, selection, iteration and variables to solve a problem. Debug programs and understand the difference between syntax and logic errors.
Excelling	Explain the advantages and disadvantages of bubble sorting algorithms. Design programs using sequencing, selection and iterative structures to write efficient code. Independently debug programs, so they meet desired outcomes.
Strand 1: Computer Science – Data and Data Representation I/They can....	
Emerging	Understand that computers use binary. Convert decimal numbers (up to 15) into binary and vice versa with support. Perform binary addition up to a nibble (4 bits) with help. Identify with support what binary can be used to represent (number, letter, sound)
Developing	Understand that humans use decimal and computers use binary. Convert decimal numbers (up to 15) into binary and vice versa independently. Perform binary addition up to a byte (8 bits) with some support. Understand that binary can be used to represent numbers, letters and sound.
Secure	Convert decimal numbers (up to 255) into binary and vice versa. Describe why computers use binary (transistors). Perform binary addition up to a byte independently. Describe how computers represent numbers, letters and sound (sampled) in a computer.
Excelling	Explain the connection between transistors (states) and binary. 0 – electricity is not flowing, 1 – electricity is flowing. Suggest what can be stored as bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte & petabyte. Understand that the ALU within the CPU carries out binary addition. Describe the relationship between the number of bits and how many characters can be represented on a computer. Consider the impact of changing sample rate on quality and file size.



Strand 1: Computer Science – Hardware and Software I/They can....	
Emerging	Know that the Internet is a global network of computers joined together. Understand that data is transferred along cables. Identify some types of hardware used in computer networks (hub, switch, router, network interface card, file server, repeater & bridge). State whether a network is a LAN or a WAN, with help. Understand that computers are arranged in a layout.
Developing	Understand that the world wide web is accessed on the Internet. Identify different types of cable and know some advantages and disadvantages Identify a range of network hardware and consider their purpose, with support. Consider what is meant by a network and use examples to show their understanding of LANs and WANs. Identify network types as either being a Star, Bus or Ring.
Secure	Describe the difference between the Internet and World Wide Web. Identify and describe cables used in the transmission of data packets. Describe advantages and disadvantages of each type. Describe the purpose of network hardware (hub, switch, router, network interface card, file server, repeater & bridge) Define what is meant by a computer network. Describe the difference between a LAN and a WAN. Describe and draw a Star, Bus and Ring network topology.
Excelling	Evaluate the impact of broadband on the World Wide Web (now multimedia-rich), compared to dial-up (text-based) Consider the limitations of different types of transmission media. Explain the similarities and differences between network hardware components. Discuss the purpose of computer networks: LANs and WANs. Describe the advantages and disadvantages of network topologies (Star, Bus & Ring)
Strand 2: Information Technology I/They can....	
Emerging	Understand that websites use HTML. Create a basic web page using a limited range of tags (title, paragraph, line break). Mainly text based. Identify simple strengths and weaknesses of their web page with support.
Developing	Understand what HTML is and identify some of the tags used. Create a basic web page using a range of HTML tags. Aspects may not be fit for purpose. Images will be included but may not be suitable. A hyperlink will be included. Describe several strengths and weaknesses of their web page.
Secure	Describe why specific HTML code is used when developing a web page. Create a web page(s) using HTML tags that is formatted appropriately for the intended purpose and audience. Images will be of a suitable size. Web page will include internal and external hyperlinks so that the website is fully navigable. Confidently discusses strengths and weaknesses of their web page.



Excelling	<p>Create a webpage of multiple pages, fully functional, that includes a range of HTML tags. Images and text are suitably aligned within clear layouts. Describe and give reasons why certain HTML tags code is used. Evaluates their webpage and makes refinements.</p>
<p>Strand 3: Digital Literacy I/They can.... *All students know to report concerns to the College DSL Miss Mason and Safeguarding Team</p>	
Emerging	<p>Understand there are laws in society surrounding digital technology (Copyright, Designs & Patents Act & Computer Misuse Act). Understand that permission is required when using digital content i.e. images off the Internet, in our own work. Describe that it is illegal to ask someone else’s computer without permission. Identify a person who gains unauthorised access to IT systems as a computer hacker. Show a basic understanding of one type of network attack (DDoS, brute force or zero day).</p>
Developing	<p>Describe with support some aspects of Copyright and Computer Misuse legislation i.e. purpose and offences. Identify types of digital creations that are protected by Copyright legislation (film, software, images etc). Understand that software comes with a license. Discuss a type of computer hacker (black, grey or white) with some accuracy. Describe a network attack (DDoS, brute force or zero day).</p>
Secure	<p>Describe the purpose of Copyright legislation (i.e. protect rights and reward). Identify most of the offences of the Computer Misuse Act and apply them to scenarios. Discuss types of licenses (single-user, multi-user and site). Confidently discuss hackers and classify them as either black, grey or white hat hackers. Explain one or more network attacks carried out on computer systems and measures to protect.</p>
Excelling	<p>Consider the impact of computer legislation on individuals and society (ethical, privacy, economic issues). Discuss a wide range of system vulnerabilities and how to avoid them.</p>