## Age Related Expectation – Computer Science



## Magna Academy Poole an Aspirations Academy

Criteria	End of KS 2	Year 7	Year 8	Year 9	Year 10	Year 11
Design, use and	I can design a	I can design	I can evaluate and	I can design and	Develop computational	I should be able to identify
evaluate	simple	computational	improve the	evaluate computational	models using appropriate	and understand how
computational	computational	models to	computational	models to solve complex	abstractions to represent real	computational abstractions
abstractions that	model to	represent more	models I have	real-world problems or	world problems and physical	can be used to represent
model the state and	represent a real-	complex real-	designed to ensure	systems.	systems; evaluate the	real-world problems and
behaviour of real-	world problem or	world problems	they accurately		effectiveness of these	physical systems. I should
world problems and	system.	or systems.	represent the		models in representing the	be able to design and
physical systems			problem or system.		problem or system	create my own
						computational abstractions
						and evaluate their
						effectiveness in
						representing the problem
						or system.
Understand several	I can identify and	I can use logical	I can design and	I can critically evaluate	Study and understand	I should be able to identify
key algorithms that	explain the	reasoning to	implement more	the efficiency and	several algorithms, such as	and understand several key
reflect computational	purpose of simple	compare the	complex algorithms to	effectiveness of the	sorting and searching	algorithms, including ones
thinking [for example,	algorithms, such	utility of	solve a range of	algorithms I have	algorithms; analyze and	for sorting and searching. I
ones for sorting and	as those for	alternative	computational	designed and	compare the utility of	should be able to compare
searching]; use logical	sorting and	algorithms for the	problems.	implemented.	alternative algorithms for the	the utility of different
reasoning to compare	searching.	same problem.			same problem	algorithms and choose the
the utility of						most appropriate one for a
alternative algorithms						given problem. I should be
for the same problem						able to implement these
						algorithms in at least two
						programming languages.

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	I can write simple programs using visual or block- based languages to solve computational problems.	I can write programs using textual languages to solve computational problems, making appropriate use of data structures such as lists, tables, or arrays.	I can design and develop modular programs that use procedures or functions to solve more complex computational problems.	I can critically evaluate and refactor programs to improve their readability, maintainability, and efficiency.	Use at least two programming languages, including one textual language, to solve computational problems; implement appropriate data structures like lists, tables or arrays; develop modular programs that use procedures or functions	I should be able to use at least two programming languages to solve a variety of computational problems, making appropriate use of data structures such as lists, tables, or arrays. I should be able to design and develop modular programs that use procedures or functions, making use of abstraction to simplify the program structure
procedures or functions						program structure.
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]	Understand and apply simple Boolean logic, binary numbers and operations in basic circuits and programming	I can use Boolean operators to solve simple problems; I can convert decimal numbers to binary and vice versa and perform basic binary operations	I can apply Boolean logic and binary operations to create more complex programs; I can identify how binary operations relate to computer hardware	I can use Boolean logic to solve problems and create efficient algorithms; I can demonstrate a clear understanding of binary numbers and how they relate to digital storage and processing	Learn and understand Boolean logic, including its uses in circuits and programming; understand how numbers can be represented in binary and perform basic operations on binary numbers like binary addition and conversion between binary and decimal	I should be able to understand the concepts of Boolean logic and how they are used in circuits and programming. I should be able to represent numbers in binary and carry out simple operations on binary numbers, such as binary addition and conversion between binary and decimal.

Understand the	Understand the	I can identify and	I can explain how	I can compare and	Study and understand the	I should be able to
hardware and software	basic components	describe the basic	software interacts	contrast different	different components that	understand the different
components that make	of a computer	components of a	with hardware to	hardware components	make up a computer system,	components that make up
up computer systems,	system and how	computer system	perform tasks; I can	and their capabilities; I	including hardware and	a computer system and
and how they	they work	and their	describe the	can design and configure	software components, and	how they communicate
communicate with one	together;	functions; I can	difference between	a basic network	how they interact with each	with each other and with
another and with other	understand how	explain how data	LANs and WANs and		other and other systems	other systems. I should be
systems	networks enable	is transferred	how they function			able to identify and explain
	communication	between devices				the function of key
	between devices	in a network				hardware components,
	and systems					such as the CPU, memory,
						and input/output devices,
						as well as key software
						components, such as the
						operating system and
						applications.
Understand how	Understand the	I can explain how	l can create more	I can design and develop	Learn and understand how	I should be able to
instructions are stored	basic structure of	instructions are	complex programs	modular programs using	instructions are stored and	understand how
and executed within a	a computer	stored and	using a textual	procedures and	executed within a computer	instructions are stored and
computer system	program and how	executed within a	programming	functions; I can optimise	system	executed within a
	instructions are	computer	language; I can debug	programs for efficiency		computer system. I should
	executed by a	program; I can	programs by	and readability		be able to explain the fetch-
	computer	create basic	identifying and			decode-execute cycle and
		programs using a	correcting errors			understand the role of the
		visual				CPU in executing
		programming				instructions.
		language				

Understand how data	Understand how	I can identify and	I can manipulate	I can create programs	Understand how different	I should be able to
of various types	digital data is	describe different	digital data using	that manipulate	types of data can be	understand how data of
(including text, sounds	represented and	types of digital	binary digits to create	different types of digital	represented and	various types can be
and pictures) can be	manipulated using	data; I can explain	simple programs; I	data; I can explain the	manipulated digitally using	represented and
represented and	binary digits	how text, sound	can explain how	impact of file	binary digits	manipulated digitally in the
manipulated digitally,		and images are	different file formats	compression on digital		form of binary digits. I
in the form of binary		stored and	store digital data	data quality and storage.		should be able to identify
digits		manipulated				and explain different file
		digitally				formats, compression
						techniques, and image and
						sound processing
						algorithms.
Undertake creative	Select and use	Select and use	Create and combine	Independently select	Select, use and combine	I should be able to
projects that involve	appropriate	multiple	multiple applications	and combine multiple	multiple applications,	undertake creative projects
selecting, using, and	software/apps to	applications to	to achieve a given	applications to achieve a	preferably across a range of	that involve selecting,
combining multiple	accomplish given	achieve a given	goal	given goal	devices, to complete creative	using, and combining
applications,	tasks.	goal			projects that involve	multiple applications,
preferably across a					collecting and analyzing data	preferably across a range of
range of devices, to					and meeting the needs of	devices, to achieve
achieve challenging					known users	challenging goals. I should
goals, including						be able to collect and
collecting and						analyze data and meet the
analysing data and						needs of known users while
meeting the needs of						taking into account
known users						usability and accessibility.

Create, re-use, revise	Create and share	Create and share	Revise and re-purpose	Create, revise and re-	Create, re-use, revise and re-	I should be able to create,
and re-purpose digital	digital content	digital content	digital content to	purpose digital content	purpose digital artefacts,	reuse, revise, and
artefacts for a given	with appropriate	with appropriate	address specific	to address specific	such as websites or	repurpose digital artifacts
audience, with	audiences while	audiences while	audience needs while	audience needs while	multimedia projects, for a	for a given audience, with
attention to	considering design	considering	considering design,	considering design,	specific audience with	attention to
trustworthiness,	and usability	design and	usability and	usability and	attention to design, usability,	trustworthiness, design
design and usability	principles.	usability	trustworthiness	trustworthiness	and trustworthiness	
		principles.	principles.	principles.		
Understand a range of	Recognize the	Understand and	Understand and	Understand and	Learn about safe, respectful,	I will learn about different
ways to use technology	importance of	implement	implement	implement appropriate	responsible and secure use	ways to protect my online
safely, respectfully,	digital safety,	appropriate	appropriate strategies	strategies for using	of technology, including	identity and privacy, and
responsibly and	privacy and	strategies for	for using technology	technology safely,	protecting online identity	how to recognize and
securely, including	security and take	using technology	safely, respectfully,	respectfully, responsibly	and privacy; recognize and	report inappropriate
protecting their online	necessary	safely,	responsibly and	and securely while	report inappropriate content,	content, contact, and
identity and privacy;	precautions while	respectfully,	securely while	protecting their online	contact and conduct	conduct. I will understand
recognise	using technology.	responsibly and	protecting their	identity and privacy.		the importance of being
inappropriate content,		securely while	online identity and	Recognize and report		responsible and respectful
contact and conduct		protecting their	privacy. Recognize	inappropriate content,		when using technology and
and know how to		online identity	and report	contact and conduct to		will practice safe and
report concerns		and privacy.	inappropriate	responsible parties.		secure online behaviors. I
		Recognize and	content, contact and	Participate in discussions		will also learn about cyber
		report	conduct to	and debates about		security risks and legal and
		inappropriate	responsible parties.	digital safety, privacy		ethical issues related to the
		content, contact		and security issues.		use of technology.
		and conduct to				
		responsible				
		parties.				