Ark John Keats Academy

Computer Science Curriculum Vision

The Computer Science Curriculum at AJK

Why should all students learn your subject?

We believe in the power of Computer Science as a discipline that will enable students to actively participate and thrive in a world heavily influenced by technology. We ultimately aim to support students in progressing to higher education and training and with their long-term career aspirations in or beyond the tech-industry.

Through their study, students will develop foundational knowledge including how computers work and how data is represented, transferred, processed and stored between computational systems. We also want students to understand what computational thinking is and apply these principles to problem solving, creating solutions either in real-life or using computers (through algorithmic design and programming). We want our students to use technology as a tool for learning and expression in a variety of disciplines and interests, becoming not just consumers of technology, but creators of it. As a result, students will be empowered use technology as an accessible medium for creative and personal expression, as well as a tool for representing and solving problems.

Finally, we want pupils to learn about the wider issues surrounding the use of technology in society, through engaging in discussions and reflecting upon the ethical, legal and environmental issues, and developing digital literacy through exploring and being critical of the media they consume through various digital platforms.

What is the core knowledge in your subject?

- Understand and apply, the fundamental principles and concepts of computer science, including abstraction, decomposition, logic, algorithms, systems and data representation.
- Analyse problems in computational terms and have repeated practical experience of writing computer programs in order to solve such problems.
- Think creatively, innovatively, analytically, logically and critically and develop their capacity to see relationships between different aspects of computer science.
- Develop mathematical skills.
- Articulate the individual (moral), social (ethical), legal and cultural opportunities and risks of digital technology and how to report a range of concerns.
- Become responsible, competent, confident and creative users of information and communication technology.

What are the key ways students practice in your subject?

- Design, write and test (programmed) solutions to a specification or to solve a problem.
- Articulating how a program works and its efficiency using logical reasoning.
- Apply computing-related mathematics.
- Explaining principles of algorithms, programming, data representation, computer systems and networks.
- Understanding and applying Boolean logic, operators and algebra and its uses in circuits and programming.
- Develop confidence and proficiency programming using a high-level language, making appropriate use of data structures, and design and develop modular sub-programs.
- Discuss wider issues and opportunities associated with the use of technology across society.

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Computer Science Curriculum Content Overview			
	Autumn	Spring	Summer
Yr 10	**Units** **Data Storage** Numbers, Characters, Images, Sound, Compression **Programming Fundamentals** **Data Types** **Additional Programming Techniques** **Boolean Logic**	**Architecture of a CPU** **CPU Performance** **Embedded Systems** **Memory and Storage** **Secondary Storage** **Additional Programming Techniques** Arrays **Defensive Design**	**Networks and Topologies** **Wired and Wireless Networks, Protocols and Layers** **Sorting and Searching Algorithms** **Testing**
Yr 11	**Languages** **Integrated Development Environment (IDE)** **Operating Systems** **Utility Software** **Ethical, Legal, Cultural and Environmental Impact** **Additional Programming Techniques** SQL and Records	**Threats to Systems and Networks** **Identifying and Preventing Vulnerabilities** **Ethical, Legal, Cultural and Environmental Impact**	
Yr 12	**Fundamentals of Data Representation** **Fundamentals of Programming** **Fundamentals of Data Structures**	**Fundamentals of Computer Systems** **Fundamentals of Computer Organisation and Architecture** **Theory of Computation** **Fundamentals of Programming**	**Fundamentals of Communication and Networking** **Consequences of Uses of Computing** **Systematic Approach to Problem Solving** **Fundamentals of Databases**
Yr 13	**Computing Practical Project (NEA)** **Fundamentals of Data Structures** **Fundamentals of Algorithms** **Theory of Computation**	**Computing Practical Project (NEA)** **Fundamentals of Functional Programming** **Big Data**	