CURRICULUM SUBJECT: COMPUTER SCIENCE
SUBJECT CONTACT: N KIERNAN

"Everybody in this country should learn how to program a computer… because it teaches you how to think."– Steve Jobs

CURRICULUM INTENT

Why is it important that pupils at Vale of York study Computer Science?
Computer Science leads to students learning vital skills as part of the curriculum. It provides excellent preparation for higher study and jobs in the field of computer science, and develops critical thinking, analysis and problem solving skills through the study of computer programming. Students who study the subject regularly progress into having careers in technology and using the skills they have learned to progress in the working world.

CURRICULUM STATEMENT

At KS3: Computing at Key Stage 3 is based on theTeach Computing package, this is a series of units which cover all aspects of the requirements for the national curriculum at KS3. Also the spiral nature of the program means that topics are revisited and developed upon, and that the fundamental skills required for progression to KS4 are covered. The programme of study covers, spreadsheets, graphics, computing hardware, networks, programming in scratch, programming in python, Algorithms, Internet safety and Cyber Security, binary and logic, sound and video editing, website design, networks and the internet and ethics of computing. This is specifically designed to meet fully the requirements of the National Curriculum and also prepares students well for studying computing further at KS4.

At KS4: In KS4 students follow the Pearson - Edexcel Computer Science GCSE, This has been chosen as an appropriate course as it has a clear and logical progress throughout the differing units, it covers a wide range of areas covering all aspects of computing in a balanced way, without over focus on any one area. It prepares students well to continue studying computing at Post 16 and also due to the range of topics covers it also prepares students well for studying other computing based courses or for an apprenticeship.

The units covered in KS4 are Computational Thinking, Developing Code, Binary Maths, Algorithms, Data Types & Structures, Subprograms. This is a logical sequence which

has references from one unit to the other and builds into a comprehensive understanding of the subject, each of the areas is visited at least twice to deepen and embed understanding.

Both GCSE Exams are worth 50% of the students overall grade for the subject:

Paper 1 - Principles of Computer Science, is a written exam lasting 1 hour and 30 minutes

Paper 2 - Application of Computational Thinking, is an onscreen exam lasting 2 hours. This practical paper requires students to design, write, test and refine programs in order to solve problems.

CURRICULUM SEQUENCE

Key stage 3:

	Year 7	Year 8	Year 9
Curriculum time	*Computer Science - 2 Hours a fortnight*	*Computer Science - 2 Hours a fortnight*	*Computer Science - 2 Hours a fortnight*
Curriculum framework	*National Curriculum*	*National Curriculum*	*National Curriculum*
Core knowledge & understanding covered	1) *Clear messaging in digital media.* 2) *Networks from semaphores to the Internet* 3) *Using media – Gaining support for a cause* 4) *Programming essentials in Scratch – part I* 5) *Programming essentials in Scratch – part II* 6) *Modelling data using spreadsheets*	1) *Media – Vector graphics* 2) *Layers of computing systems* 3) *Developing for the web* 4) *Representations – from clay to silicon* 5) *Mobile app development* 6) *Introduction to Python programming*	1) *Python programming with sequences of data* 2) *Media - Animations* 3) *Data science* 4) *Representations – going audiovisual* 5) *Introduction of cyber security* 6) *Applying programming skills with physical computing*
Subject specific skills	● *Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems* ● *Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems* ● *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.*		

Personal attributes evolved that support learning	*Understanding different viewpoints and respecting differences of opinion* *Resilience* *Basic computer skills* *Revision and recall skills (independence, self-managers)* *Independent enquirers and problem solving* *Team workers* *Numeracy - interpreting data, graphs etc.*
Disciplinary Literacy	<u>*Key Vocabulary:*</u>

Abbreviation	Strand	Description
NW	Networks	Understand how networks can be used to retrieve and share information, and how they come with associated risks
CM	Creating media	Select and create a range of media including text, images, sounds, and video
DI	Data and information	Understand how data is stored, organised, and used to represent real-world artefacts and scenarios
DD	Design and development	Understand the activities involved in planning, creating, and evaluating computing artefacts
CS	Computing systems	Understand what a computer is, and how its constituent parts function together as a whole
IT	Impact of technology	Understand how individuals, systems, and society as a whole interact with computer systems
AL	Algorithms	Be able to comprehend, design, create, and evaluate algorithms
PG	Programming	Create software to allow computers to solve problems
ET	Effective use of tools	Use software tools to support computing work
SS	Safety and security	Understand risks when using technology, and how to protect individuals and systems

Key Stage 4:

	Year 10	Year 11
Curriculum time	*Computer Science - 5 hours a fortnight*	*Computer Science - 5 hours a fortnight*
Curriculum framework	*Computer Science - Pearson - Edexcel - both papers are worth 50% , Paper 1 is 1 hour 30 mins, Paper 2 is 2 hours;* ● *Paper 1 - Principles of Computer Science* ● *Paper 2 - Application of Computational Thinking*	
Core knowledge & understanding covered	*Computer Science* *Computational thinking* *Data* *Computers* *Networks* *Issues and impact*	*Computer Science* *Developing Code* *Binary Maths* *Algorithms* *Data Types & Structures* *Subprograms*
Subject specific skills	*Computer Science* *Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems* ● *Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems* ● *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.*	
Personal attributes evolved that support learning	● *Understanding different viewpoints and respecting differences of opinion* ● *Resilience* ● *Revision and recall skills (independence, self-managers)*	

	• Independent enquirers and problem solving • Numeracy - interpreting data, graphs etc. • Understanding of different careers/aspirations using computing/technology.

Computer Science exam board specification:

https://qualifications.pearson.com/content/dam/pdf/GCSE/Computer%20Science/2020/specification-and-sample-assessments/GCSE_L1_L2_Computer_Science_2020_Specification.pdf

CURRICULUM OPPORTUNITIES

Within the formal curriculum	*Students are introduced to Computer Science through a range of projects using a variety of materials and resources. Lessons are taught in mixed ability classes and will focus on theory of computational thinking, processes and focused practical tasks.*
Links to other curriculum areas	*Our main curriculum links are with History, Geography and Maths.* ***History*** *- Students at KS3 will study layers of Computational Thinking, History of Computing and Media Vector Graphics throughout Years 7, 8 and 9.* ***Geography*** *- Students throughout the course will study the Use of Cell Referencing, Charts & Data Analysis and use of referencing on maps.* ***Maths*** *- Students study Computational Thinking and Data Types and Structures throughout KS3.*
Preparation for adult life	*All units at KS3 are a starting basis for students using computers to create & complete their given tasks, all KS3 units flow naturally into the GCSE KS4 curriculum. Specific careers are referenced throughout the course.*

CURRICULUM IMPLEMENTATION

As an Academy we have a range of clear standards and expectations of our pupils however each subject area has its own individual practices and habits that ensure that it can function to its optimum.

Curriculum delivery:

In Computer Science, students learn in a variety of different ways. By combining a range of tasks and activities all learning types are catered for, such as visual, auditory, kinesthetic and reading/writing learners. A large amount of work is completed online using a computer, students build up their skills of learning throughout their time at Vale of York Academy.

Homework:

	Frequency	Expected time to complete	Completion notes and handing in	What to do if stuck
7	*Once a week*	*30 minutes*	*Students will be given a full week to complete the homework. Homework will comprise a worksheet based on the lesson students have covered that week.*	*See teacher/refer to Google classroom for support*
8				
9				
10	*Once a week*	*Up to 2 hours*	*Students will be given a full week to complete the homework. Homework will be a mixture of revision and research tasks.*	*See teacher/refer to Google classroom for support*
11	*Once a week*	*Up to 2 hours*	*Students will be given a full week to complete the homework. Homework will be centred around revision and research tasks. Homework booklets for each GCSE unit will be provided.*	*See teacher/refer to Google classroom for support*

SUPPORTING YOUR CHILD

	Resources to support your child	Relevance - How it helps
Key Stage 3	Replit - https://replit.com/ Scratch - https://scratch.mit.edu/ Python - https://www.python.org/	Allows users to create online projects and write code, allowing students to improve skills for practical lessons.
Exam courses	BBC Bitesize	Covers all units taught for the GCSE course.

WIDER INTEREST

- *https://isaaccomputerscience.org/?examBoard=all&stage=all - Isaac Computer Science is a website providing revision resources for students aiming to be successful in the GCSE course.*

- *https://www.youtube.com/@craigndave - Craig'n'dave on YouTube provides free videos covering the entire syllabus for the Edexcel curriculum. Students can use these videos as a different form of learning, during revision.*