CURRICULUM ROADMAP - Nursery to Year 13

Computing

BIRKENHEAD HIGH SCHOOL ACADEMY

GDST GIRLS' DAY SCHOOL TRUST

Year 13 (SUM)
Revision

Year 13 (SPR)
Programming Project
Algorithms
Data types
Ethical / Legal / Cultural issues

Year 13 (AUT)
Programming Project
Exchanging data
(databases / encryption / compression / hashing)
Algorithms

Year 12 (SUM)
Networks and web technologies
Programming Techniques
Computational thinking / methods

Year 12 (SPR)
Data structures and algorithms
Programming techniques

Year 12 (AUT)
The CPU / hardware devices
Programming and problem solving
Software Development

Year 11 (SUM)
Algorithms
Revision

Year 11 (SPR)
Algorithms
Ethical / Legal issues

Year 11 (AUT)
Network security
Algorithms
Boolean Logic

Year 10 (SUM)
Creating robust programs
Programming Techniques

Year 10 (SPR)
Data Representation
Computer Networks
Programming Techniques

Year 10 (AUT)
The CPU
Memory and storage
Programming Techniques

Year 9 (SUM)
Cyber Security
Computing Impacts Project 3 (AI and Machine Learning)

Year 9 (SPR)
3D Animation
Using data science

Year 9 (AUT)
Data Representation: Images and Sounds
Graphic Design (Film Poster)

Year 8 (SUM)
Programming: Python
Computing Impacts Project 2 (Ethics)

Year 8 (SPR)
Developing for the web
Computer Systems

Year 8 (AUT)
Developing Vector Graphics
Mobile App Development

Year 7 (SUM)
Data representation: Numbers and Text
Computing Impacts Project 1 (Environment)

Year 7 (SPR)
Using Media
Data Modelling

Year 7 (AUT)
Clear messaging in digital media.
Programming: Scratch

Year 6 (SUM)
Programming—Using variables in games.
This unit explores the concept of variables in programming through games in Scratch. First, pupils will learn what variables are, and relate them to real-world examples of values that can be set and changed. Pupils will then use variables to create a simulation of a scoreboard. Using the *Use-Modify-Create* model, pupils will experiment with variables in an existing project, then modify them, then they will create their own project. Finally, pupils will apply their knowledge of variables and design to create and improve their own computer game in Scratch.

Year 6 (SPR)
Data and Information—Spreadsheets This unit introduces pupils to spreadsheets. They will be supported in organising data into columns and rows to create their own data set. Learners will be taught the importance of formatting data to support calculations, while also being introduced to formulas and will begin to understand how they can be used to produce calculated data. Learners will be taught how to apply formulas that include a range of cells, and apply formulas to multiple cells by duplicating them. Learners will use spreadsheets to plan an event and answer questions. Finally, pupils will create graphs and charts, and evaluate their results in comparison to questions asked.
Creating media - web page creation: Pupils will be introduced to the creation of websites for a chosen purpose, identify what makes a good web page and use this information to design and evaluate their own website using Google Sites. Throughout the process, learners pay specific attention to copyright and fair use of media, the aesthetics of the site and navigation paths.

Year 6 (AUT)
Computer Systems and Networks—Communication. Pupils learn about the World Wide Web as a communication tool. They learn how search engines work (including how they select and rank results). They will evaluate which methods of internet communication to use for particular purposes.
Media—3D modelling Pupils use a computer to produce 3D models in Tinkercad. They will initially familiarise themselves with working in a 3D space, including combining 3D objects to make a house and examining the differences between working digitally with 2D and 3D graphics. They make accurate 3D models and use 3D objects as placeholders. Finally, learners will examine the need to group 3D objects, then go on to plan, develop, and evaluate their own 3D model of a photo frame.

Year 5 (SUM)
Media—Vector Drawing In this unit, pupils create vector drawings. They learn to use different drawing tools to help them create images and recognise that images in vector drawings are created using shapes and lines, and each individual element in the drawing is called an object. Learners layer objects and begin grouping and duplicating them to create more complex pieces of work. This unit is linked to Art learning on Kandinsky and the creation of a Liverpool skyline in a Kandinsky style.

Year 5 (SPR)
Data and Information—Flat File databases. This unit looks at how a flat-file database can be used to organise data in records. Pupils use tools within a database to order and answer questions about data. They create graphs and charts from their data to help solve problems. They use a real-life database to answer a question, and present their work to others.
Creating media - video production: Pupils will learn how to create short videos. As they progress through this unit, they will be exposed to topic-based language and develop the skills of capturing, editing and manipulating video.

Year 5 (AUT)
Programming—selection in quizzes. Pupils explore how conditions can be used in programs and use the *If… Then… Else* structure to select different outcomes, depending on whether a condition is true or false. They use selection outcomes to design a True of False quiz in Scratch. As an extension, they create a points variable for their quiz program.

Year 4 (SUM)
Programming - Repetition in Games
This unit explores the concept of repetition in programming using the Scratch environment. It begins with a Scratch activity where pupils can discover similarities between two environments. Pupils look at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. Their final project is to design and create a game which uses repetition, applying stages of programming design throughout.
Photo editing: Pupils will develop their understanding of how digital images can be changed and edited and how they can be resaved and reused. They will consider the impact that editing images can have, and evaluate the effectiveness of their choices.

Year 4 (SPR)
Programming - repetition in shapes.
Pupils will create programs by planning, modifying and testing commands to create shapes and patterns. They will use Logo, a text-based programming language.

Year 4 (AUT)
Computer Systems and Networks—The Internet
Pupils explore the internet as a network of networks which need to be kept secure. They will learn that the World Wide Web is part of the internet, be given opportunities to explore the World Wide Web for themselves in order to learn about who owns content, what they can access, add and create. Finally, they will evaluate online content to decide how honest, accurate, or reliable it is, and understand the consequences of false information.
Data and Information - using Dataloggers Pupils consider how & why data is collected over time, how computers use special input devices called sensors to monitor the environment. They collect data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals. Pupils will spend time using a computer to review and analyse data. They ask their own questions, then use data loggers to automatically collect the data needed to answer those questions.

Year 3 (SUM)
Programming -Sequence in music
In Scratch, pupils are introduced to a selection of motion, sound, and event blocks which they will use to create their own programs, featuring sequences. The final project is to apply stages of program design and to make a representation of a piano
Programming—Events and Actions
Pupils begin by moving a sprite in four directions (up, down, left and right). They will then explore movement within the context of a maze, using design to choose an appropriately sized sprite. This unit also introduces programming extensions, through the use of pen blocks. Pupils draw lines with sprites and change the size and colour of lines, and finally code their own maze trace program.

Year 3 (SPR)
Computing Systems and Networks
Pupils develop their understanding of digital devices, with an initial focus on inputs, processes, and outputs. They start by comparing digital and non-digital devices, before introducing computer networks that include network infrastructure devices like routers and switches.
Creating media: stop frame animation
Pupils will use a range of techniques to create a stop-frame animation using chromebooks and apply those skills to create a story-based animation. This unit will conclude with pupils adding other types of media to their animation, such as music & text.

Year 3 (AUT)
Creating Media—Desktop Publishing Pupils learn how 'text' and 'images' can be used to communicate messages. They use desktop publishing software and consider choices of font size, colour and type to edit and improve documents. They learn how 'templates', 'orientation', and 'placeholders' can support them in making their own magazine front cover. They add text and images to their own pieces of work using desktop publishing software and evaluate how and why desktop publishing is used in the real world.
Branching Databases Pupils develop their understanding of what a branching database is and how to create one. They will gain an understanding of what attributes are and how to use them to sort groups of objects by using yes/no questions. The learners will create physical and on-screen branching databases. Finally, they will evaluate the effectiveness of branching databases and will decide what types of data should be presented as a branching database.

Year 2 (SUM)
Programming—an introduction to quizzes Pupils begin to understand that sequences of commands have an outcome and make predictions based on their learning. They use and modify designs to create their own quiz questions in Scratch Jr and realise these designs in ScratchJr using blocks of code. Finally, learners evaluate their work and make improvements to their programming projects.

Year 2 (SPR)
Media—Making Music Learners will explore how music can make them think and feel. They will make patterns and use those patterns to make music with both percussion instruments and digital tools. They will also create different rhythms and tunes, using the movement of animals for inspiration. Finally, learners will share their creations and compare creating music digitally and non-digitally.
Data and information—Pictograms This unit introduces the learners to the term 'data'. Learners will begin to understand what data means and how this can be collected in the form of a tally chart. They will learn the term 'attribute' and use this to help them organise data. They will then progress onto presenting data in the form of pictograms and block diagrams and use the data to answer questions.

Year 2 (AUT)
Computing systems and networks—IT around us With an initial focus on IT in the home, learners explore how IT benefits society in places such as shops, libraries, and hospitals. Whilst discussing the responsible use of technology, and how to make smart choices when using it.

Year 1 (SUM)
Programming - introduction to animation.
Pupils use Scratch Jnr to investigate sprites and backgrounds. They will use programming blocks to use, modify, and create programs. Learners will also be introduced to the early stages of program design through the introduction of algorithms.

Year 1 (SPR)
Media - Digital Painting
Explore the world of digital art and its exciting range of creative tools with your learners. Empower them to create their own paintings, while getting inspiration from a range of other artists. Conclude by asking them to consider their preferences when painting with digital devices.

Year 1 (AUT)
Computing Systems and Networks - technology around us.
Pupils become more familiar with the different components of a computer by developing their keyboard and mouse skills, and also start to consider how to use technology responsibly.

Reception (SUM)
[repeated units throughout EYFS from F1-F2]
Computational thinking - creating and thinking critically
Barefoot Computing ***'Summer fun'*** *- lighthouses: creating algorithms*

Reception (SPR)
[repeated units throughout EYFS from F1-F2]
Computational thinking - Active learning, tinkering and persevering
Barefoot Computing ***'Winter Warmers'*** *- logical reasoning*

Reception (AUT)
[repeated units throughout EYFS from F1-F2]
Computational thinking - playing and exploring in our environment
Barefoot Computing ***'Awesome Autumn'*** - making maps and following instructions

Nursery (SUM)
Computational thinking - creating and thinking critically
Barefoot Computing ***'Summer fun'*** *- lighthouses: creating algorithms*

Nursery (SPR)
Computational thinking - Active learning, tinkering and persevering
Barefoot Computing ***'Winter Warmers'*** *- logical reasoning*

Nursery (AUT)
Computational thinking - playing and exploring in our environment
Barefoot Computing ***'Awesome Autumn'*** - making maps and following instructions