



YEAR 10 GCSE COMPUTER SCIENCE SPRING TERM 1 – PAPER 1

'An ambitious curriculum that meets the needs of all'

Medium Term Planning – Data Representation

Curriculum Intent	Pupils will be taught the following National Curriculum guidelines this term:
Skills/Assessment Objective Links	<p>At the end of this Unit all students should be able to:</p> <ul style="list-style-type: none"> • Define the terms bit, byte, kilobyte, megabyte, gigabyte • Understand that data needs to be converted into a binary format to be processed by a computer • Add two 8-bit binary integers • Understand the term 'character set' • Understand how a bitmap graphic is made up of individual pixels • Explain how each pixel is represented in binary <p>Most students will be able to:</p> <ul style="list-style-type: none"> • Define the terms nibble, terabyte and petabyte • Convert positive denary whole numbers (0-255) into 8-bit binary numbers and vice versa • Convert positive denary whole numbers (0-255) into 2-digit hexadecimal numbers and vice versa • Add two 8-bit binary integers and explain overflow errors which may occur • Understand the use of binary shifts • Understand the use of binary codes to represent characters • Understand the term 'character set' • Explain the relationship between the number of bits per character in a character set, and the number of characters that can be represented using: <ul style="list-style-type: none"> – ASCII – Extended ASCII – Unicode • Explain the need for image metadata • Explain the relationship between file size and image resolution • Be able to represent a short sound file in binary • Explain the trade-off between file size and the quality of playback <p>Some students will be able to:</p> <ul style="list-style-type: none"> • Convert between binary, denary and hexadecimal equivalents of the same number • Understand that the number of bits per pixel determines the number of available colours for an image • Explain how sampling intervals and resolution affect the size of a sound file using the terms: <ul style="list-style-type: none"> o Sample rate o Bit depth • Understand how sound is sampled and stored in digital form
Numeracy	Bit, nibble, byte, kilo, mega, giga, tera, peta, binary, bit depth, sample rate, binary shift, shift left, shift right,
Literacy	<p>Vocabulary Tier 3: Bit, nibble, byte, kilo, mega, giga, tera, peta, binary, bit depth, sample rate, colour depth, pixel, bit per character, binary shift, shift left, shift right, most significant bit, least significant bit, character set, ASCII, Unicode, metadata, hertz, compression, lossy, lossless</p> <p>Vocabulary Tier 2: storage, image, sound</p> <p>Reading: Worksheets, presentations, answer sheets, exam questions, mark scheme, further reading for homework</p> <p>Writing: Answer on the worksheet via word</p> <p>Oracy: listening and using tier 3 words</p>
Becoming future ready	<p>Careers/Employability:</p> <ul style="list-style-type: none"> ▪ Software Architect. ▪ Data Scientist.

	<ul style="list-style-type: none"> Machine Learning Engineer. Blockchain Developer Cybersecurity Engineer. Cloud Solutions Architect. AI Research Scientist. Full-Stack Developer.
Adaptation	Throughout this topic, quality first teaching will provide differentiation:
QFT/SEND Provision	<p>By product: Learners are asked to present outcomes in a different way via pieces of writing, targeted questioning, models and drawings and speaking.</p> <p>By resource: Worksheets are well presented and accessible. Instructions are clearly outlined and separate from the information so that pupils know where to begin and end. Handouts are differentiated by outcome. Resources used will appeal to the range of preferred learning styles of pupils e.g. visual, auditory or kinesthetic learners. Scaffolding of tasks – word frames.</p> <p>By Intervention: By providing different levels of supervision and support</p> <p>By Progressive Questioning: Exploring pupils’ understanding through interactive dialogue using Blooms Taxonomy.</p> <p>By Grouping: According to prior attainment, gender, social preference, preferred learning style.</p> <p>By Task: Pupils identify targets which are meaningful to them via feedback sheets</p> <p>By Offering Optional Activities: In class or as homework, to extend learning.</p> <p>This QFT/SEND provision will be explicit within the lesson by lesson schemes of work.</p>
Implementation Curriculum Delivery	To be able to:
Learning Outcomes (Knowledge)	<p>Topic 1 Units and binary numbers Define the terms bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte and petabyte Understand that data needs to be converted into a binary format to be processed by a computer Convert positive denary whole numbers (0-255) into 8-bit binary numbers and vice versa</p> <p>Topic 2 Binary arithmetic and hexadecimal Convert positive denary whole numbers (0-255) into 2-digit hexadecimal numbers and vice versa Convert between binary, denary and hexadecimal equivalents of the same number Add two 8-bit binary integers and explain overflow errors which may occur Understand the use of binary shifts</p> <p>Topic 3 Characters Understand the use of binary codes to represent characters Understand the term ‘character set’ Explain the relationship between the number of bits per character in a character set, and the number of characters that can be represented using: – ASCII – Extended ASCII – Unicode</p> <p>Topic 4 Images Understand how a bitmap graphic is made up of individual pixels Explain how each pixel is represented in binary Understand that the number of bits per pixel determines the number of available colours for an image Explain the need for image metadata Explain the relationship between file size and image resolution</p> <p>Topic 5 Sound Understand how sound is sampled and stored in digital form Be able to represent a short sound file in binary Explain how sampling intervals and resolution affect the size of a sound file using the terms: – Sample rate – Bit depth Explain the trade-off between file size and the quality of playback</p>

**Topic 6 Compression**

Explain the need for compression

Describe the difference between lossy and lossless compression

End of unit assessment

**Current learning to
be developed in the
future within:**

Assessment

See assessment maps for formative and summative assessment opportunities.

Impact

Review assessment results and target pupils that require further support via:-

- Learning conversation
- Changing seating plan
- Plan lessons to address areas of concern in assessment
- Targeted homework based on low performance areas identified in the assessment and marked pieces
- Stretch and challenge high ability pupils by identifying ambitious next steps to expand knowledge

Create a feedback sheet for each student

Each student identifies areas of Green, Amber and Red using Mark Assessment on their feedback sheet

Complete NOW task on areas identified as Amber and Red