Topic: Unit 1.2.3 & 1.2.4 Units and Data Storage

Key vocabulary:	**Core knowledge questions**	**Powerful knowledge crucial to commit to long term memory**	**Links to previous and future topics**
Binary Denary Hexadecimal Conversion Transistor Bit Binary Bit Nibble Byte Kilobyte Megabyte Gigabyte Terabyte Petabyte Character[16] Unicode ASCII Metadata Pixels Pixel Depth Direct Colour Converted Resolution Sample frequency/rate Sample size/bit depth Compression	1. List and convert units of data storage: • Bit • Nibble (4 bits) • Byte (8 bits) • Kilobyte KB (1,000 bytes or 1,024 bytes) • Megabyte MB (1,000 bytes or 1,024 KB) • Gigabyte GB (1,000 bytes or 1,024 MB) • Terabyte TB (1,000 bytes or 1,024 GB) • Petabyte PB (1,000 bytes or 1,024 TB) 2. Why does data needed to be converted into a binary format to be processed by a computer? 3. Understand data capacity and calculation of data capacity requirements 4. Know how to convert positive denary whole numbers into binary numbers (8 bits inclusive) and vice-versa 5. Know how to add two binary integers together (8 bits inclusive) and explain overflow errors which may occur 6. Know how to convert positive denary whole numbers into 2-digit hexadecimal numbers and vice-versa 7. Know how to convert binary integers to their hexadecimal equivalents and vice-versa 8. Know how to perform Binary Shifts 9. Use binary codes to represent characters 10. Define the term 'Character set' 11. Understand the relationship between the number of bits per character in a character set, and the number of characters which can be represented: ASCII / Unicode 12. How an image is represented as a series of pixels, represented in binary 13. What is Metadata? 14. What is the effect of colour depth and resolution on: the quality of the image; the size of an image file? 15. How can sound be sampled and stored in a digital form? 16. What is the effect of sample rate, duration and bit depth on: the playback quality; the size of a sound file?	• Why data must be stored in binary format • Have familiarity with data units and moving between each • Calculate capacity of devices • Calculate required capacity for a give set of files • Calculate file sizes of sound, images and text files ○ Sound = sample rate x duration (s) x bit depth ○ Image = colour depth x image height (px) x image width (px) ○ Text file = bits per character x number of characters • Denary number range 0 – 255 • Hexadecimal range 00 -FF • Binary number range 00000000 – 11111111 • Understanding of the terms most and least significant bit • Conversion of any number in these ranges to another base • Understand the effect of a binary shift (left or right) • Know how characters are represented in binary • How the number of characters stored is limited by the bits available • The differences between and impact of each character set • Understand how character sets are logically ordered • Binary representation of ASCII using 8 bits • Each pixel has a specific colour, represented by a specific code • The effect on image size and quality when changing colour depth and resolution • Metadata stores additional image information • Analogue sounds must be stored in binary • Sample rate – measured in Herts (Hz) • Duration – how many seconds of audio the sound file contains • Bit depth – number of bits available to store each sample	• Units and Data Storage are covered in Y7 and Y8 • Units and Data Storage is fundamental to Computer Science and will be revisited throughout the course.

We will develop these skills:

Impressive reading	**Impressive speaking**	**Impressive writing**	**Resilience**	**Numeracy via:**	**Digital Literacy via:**	**Employability via:**
Research using the Internet to find relevant and appropriate information	Discussion of research findings. Discussion in groups of Units and Data	Recording research findings appropriately. Writing key terms for Units and Data Storage.	Developing ability to consistently amend and refine work.	Conversions between different number bases Addition of 8-bit binary numbers	Use of the Internet Use of MS Office Suite	Teamwork – working in groups Flexibility – taking on opinions of others

about Units and Data Storage. Interpret scenarios to calculate required storage capacity	Storage characteristics	Writing definitions. Answering exam questions	Listen to others' opinions	Estimate file sizes using the appropriate formulae. Convert file size calculations into an appropriate measurement		Problem Solving – using information to assess storage capacities needed as well as numerical calculations
SEND						
• Peer Support - Some students may be more aware Units and Data Storage – use these students as Lead Students • Differentiated Activities and Tasks, choice of tasks for certain activities, support sheets • Questioning • Flipped Learning resources for students to study either prior to or after lesson • Peer Assessment / Support on labelling tasks						