KESTEVEN AND SLEAFORD HIGH SCHOOL

Computing Scheme of Learning

Year 9 – Topic 2 – Encoding & Encryption

Intent – Rationale

Topic Intent: Introduce students to the concept of data encoding (text, images and sound) and the role of encryption in Computer Science

Curriculum Intent: Developing an understanding of some of the underlying principles of Computer Science, with a focus on mathematical skills...

KS3 PoS: Understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits... understand a range of ways to use technology safely,

Sequencing – what prior learning does this topic build upon?	Sequencing – what subsequent learning does this topic feed into?
• Year 9 Unit 1: Binary	• GCSE Computer Science (J277 1.2.4) • A-Level Computer Science (H446 1.3.1 and AO1) • Further/Higher Education and Related Careers
What are the links with other subjects in the curriculum?	**What are the links to SMSC, British Values and Careers?**
• N/A	• GB4E
What are the opportunities for developing literacy skills and developing learner confidence and enjoyment in reading?	**What are the opportunities for developing mathematical skills?**
Directly linked to topic ○ N/A Wider Reading/Interest: ○ The Secret Life of Bletchley Park: The WWII Codebreaking Centre and the Men and Women Who Worked There	• File size calculations • Unit conversions

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Intent – Concepts

What knowledge will students gain and what skills will they develop as a consequence of this topic?

Know

- Understand how text can be encoded into binary using a character set (ASCII, Unicode)
- Understand how bitmap images are be encoded (pixel, resolution, colour depth)
- Understand how sound is encoded (sample rate, sample depth, bit rate, channels)
- Understand some of the basic encryption algorithms (e.g. Caesar, keyword, Atbash, affine), their limitations and the role encryption plays in modern communication

Apply

- Be able to encode/decode text using the ASCII 7bit character set
- Be able to calculate image and sound files sizes and compare the likely quality of images/sound based on their metadata
- Be able to encrypt/decrypt messages using simple ciphers
- Be able to describe where encryption is routinely used and why it is important in modern life, especially in regards to IT/Networks/Communications

Extend

- Investigate the use of run length encoding to compress digital data
- Investigate the basic principles of asymmetric encryption to provide secure internet connections using Public/Private Key encryption

What subject specific language will be used and developed in this topic?	What opportunities are available for assessing the progress of students?
• **Digital:** *representing data using binary (0s and 1s)* • **Encode***:* *Convert data into a digital (binary) form* • **Decode***:* *Convert data from a digital form* • **Character Set***:* *A defined list of characters recognised by the computer* • **Encrypt***:* *Scramble a message into cipher text to prevent unauthorised reading* • **Decrypt***:* *Unscramble an encrypted message into plaintext* • **Ciphertext***:* *A message after it has been encrypted* • **Plaintext***:* *The original human-readable message*	• Workbooks, in-lesson observation and starter/quizzes/plenaries • Moodle-based end of unit assessment

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Intent – Concepts

Lesson title	Learning challenge	Higher level challenge	Suggested activities and resources
			See T drive