Scheme of Learning: Year 8 Computing

Topic Sequence:

1	2	3	4	5	6
Computer Systems	Representation	Developing for the Web	Intro to Python	Heroes of Computing	Mobile App

Topic Overview:

This unit conveys essential knowledge relating to binary representations. The activities gradually introduce learners to binary digits and how they can be used to represent text and numbers. The concepts are linked to practical applications and problems that the learners are familiar with.

Links
Year 8 Computer Systems, GCSE Computing Unit 2 Data

Lesson Sequence:

Lesson 1: Across time and space - Learners discuss familiar examples of representations, some of which date back millennia, to better understand their use and characteristics. This prepares learners for their encounter with binary representations in the context of computing, and places these within a much broader (and more familiar) context.

Lesson 2: Lights and drums - Learners work in groups through an activity that requires them to encode, transmit, and decode short messages, with each group using a different coding scheme and communication medium (signals, light, sounds, holes on paper, etc.). The activity reinforces the learners' understanding of text representation using sequences of symbols, while emphasis is placed on distinguishing between symbols and the way in which they are embodied in physical media.

Lesson 3: Binary digits - Learners grasp what binary digits are by associating them with familiar sets of symbols such as letters and decimal digits. Learners solve simple problems that reinforce the connection between (alphanumeric) information and its binary representation. They also consider the question of why binary digits are predominantly used in conjunction with computing systems.

Lesson 4: Numbers in binary - Learners build upon their familiarity with using a decimal numbering system, in order to draw analogies with how numbers can be represented using binary. They use activities, either unplugged or software-based, to become familiar with binary number representation and convert between binary and decimal.

Lesson 5: Large quantities - This lesson familiarises learners with bytes and the prefixes used for measuring representation size, such as 'kilo-', 'mega-', 'giga-' and 'tera-'. Simple activities embed these concepts in real-life settings and introduce learners to conversions between the different units and multiples.

Lesson 6: Turing's mug - The unit is concluded with a summative assessment quiz and a puzzle activity that challenges learners to unchain Alan Turing's mug.

National curriculum links
- Understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits

Sequence of Lessons:

1	Across time and space
2	Lights and drums
3	Binary digits
4	Numbers in binary
5	Large quantities
6	Turing's mug

Topic Resources:

Knowledge Map:	8.2 Representation	Any other Resources:	

Assessment:

Knowledge:	20 Multiple Choice Questions and 3 Fill in the words Questions.
Application of Knowledge:	Problem Solving activity in **Turing's mug**

Supportive Reading:

Binary	Binary	Interactive	Computing (advanced-ict.info))
Data Representation	Data representation - KS3 Computer Science - BBC Bitesize
KS3 Computing Complete Revision & Practice CGP	Chapter 1 Available from: KS3 Computing Complete Revision & Practice	CGP Books