LEARNING JOURNEY COMPUTING

DATA REPRESENTATION – AUDIO VISUAL

GOLDEN THREAD QUESTION

In this unit, you will focus on digital media such as images and sounds, and discover the binary digits that lie beneath these types of media. Just like in the previous unit, where you examined characters and numbers, the ideas that you need to understand are not really new to you. You will draw on familiar examples of composing images out of individual elements, mixing elementary colours to produce new ones, and taking samples of analogue signals, to illustrate these ideas and bring them together in a coherent narrative. This unit also has a significant practical aspect. You will use relevant software (GIMP and Audacity, in this case) to manipulate images and sounds and get an idea of how the underlying principles of digital representations are applied in real settings. This unit builds on the material from the Year 8 unit, 'Representations: from clay to silicon'.

Images

WE ARE HERE
- Describe how digital images are composed out of individual elements
- Recall that the colour of each picture element is represented using a sequence of bits
- Define key terms such as pixels, resolution, colour depth
- Describe how colour is represented
- Describe how an image can be represented as a sequence of bits
- Explain how the manipulation of digital images amounts to arithmetic operations
- Calculate the representation size of a (bitmap) digital image

Sounds

- Recall that sound is a wave and explain the function of microphones and speakers
- Define key terms such as 'sample', 'sampling rate' and 'sample size'.
- Describe how sound can be represented as a sequence of bits
- Explain how the manipulation of digital sounds amounts to arithmetic operations
- Calculate the representation size of a (PCM-coded) digital sound

Compression

- Define 'compression' and explain why it is necessary
- Describe the trade-off between size and quality

TUDOR HABITS
You will develop **technical** skills as you work through this unit.

VOCABULARY
Pixels, resolution, colour depth, sample, sampling rate, sample size, compression