

## 9.1 Representing data on images and with sound

### Year 8 data recap

1. Bit
2. Nibble
3. Byte
4. Kilobyte
5. Megabyte
6. Gigabyte
7. Terabyte
8. Petabyte



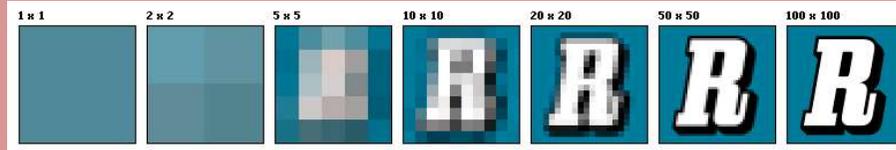
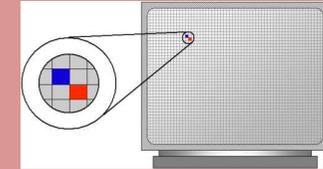
Each 1 or 0 is a bit. Short for **binary digit**.

There are **8 bits** in a **byte**  
Then **1000** of each smaller unit in each bigger unit.

|     |    |    |    |   |   |   |   |
|-----|----|----|----|---|---|---|---|
| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
|     |    |    |    |   |   |   |   |

# Representing images

Images are made up of **pixels** (picture elements). Typically a tiny dot that can normally only be seen when zoomed in



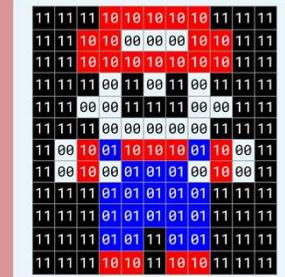
The total number of pixels (row \* columns) equates to the image **resolution**. A higher **resolution** will mean increase in quality but will also require higher storage space

# Representing sound

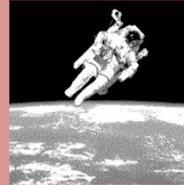
Analogue signals are converted to digital signals so that they can be processed by a computer.  
This process is called **sampling**.



The colour of each pixel is represented by a binary code.  
More colours = more bits (longer binary code)



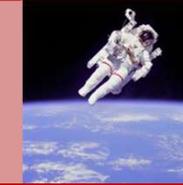
Colour depth: the number of bits used for each pixel.  
**MORE COLOURS = BETTER QUALITY BUT LARGER FILE.**



1 bit colour  
depth = 2  
colours



2 bit colour  
depth = 4  
colours



24 bit colour (RGB)  
depth = 16 million

| Sample intervals   | Sample rate  | Sample size                                     | Representation size                                  |
|--|--|---|--|
| The time gap between taking a sample .e.g sampled every 5 milliseconds | How many samples are taken in a second.<br>44.1khz means 44,100 are taken per second | How many bits are recorded for each measurement | sampling rate *<br>Sample size *<br>duration of clip |

Increasing any of the above will lead to greater quality but a higher file size.

**File size = resolution (columns \* rows) \* colour depth**

Manipulation is to use various techniques to alter and adjust an image



|                       |            |
|-----------------------|------------|
| Image                 |            |
| Image ID              |            |
| Dimensions            | 563 x 302  |
| Width                 | 563 pixels |
| Height                | 302 pixels |
| Horizontal resolution | 96 dpi     |
| Vertical resolution   | 96 dpi     |

Metadata is the data stored in an image file which helps the computer recreate the image on screen. *File format, height, width, colour-depth and resolution, time/date/location image was taken.*  
**WITHOUT METADATA, DEVICES WOULD NOT BE ABLE TO DISPLAY IMAGES.**

## 9.1 Data Representation

### What I need to know:

|  |  |  |  |
|--|--|--|--|
| <b>Data sizes</b>  |  |  |  |
| Define the term bit.   |  |  |  |
| How many bits are in a byte?   |  |  |  |
| Order the binary units from smallest to largest.   |  |  |  |
| <b>Representing images</b>   |  |  |  |
| Explain how images are represented on a computer system using the terms colour depth and resolution. |  |  |  |
| What is a pixel?   |  |  |  |
| What is image resolution   |  |  |  |
| What is colour depth?  |  |  |  |
| Define the term metadata.  |  |  |  |
| How do you calculate the file size of an image?  |  |  |  |
| Describe what happens to the image when resolution and/or colour depth is increased?                 |  |  |  |
| Define image manipulation  |  |  |  |
| <b>Representing sound</b>  |  |  |  |
| What is sound (WAVE)   |  |  |  |
| Define Sample interval   |  |  |  |
| Define Sample frequency  |  |  |  |
| Define Sample size   |  |  |  |
| How do you calculate the file size of a sound clip?  |  |  |  |