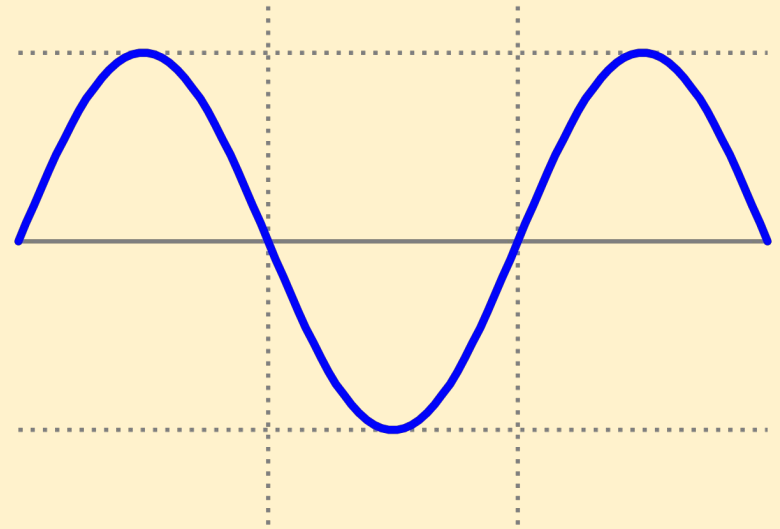


Representing sound

Sound waves are **analogue**.

To store them on a computer we need to digitise them - turn them into numbers which can be represented using binary.

This means **sampling**



Representing sound

Sampling rate - how many times a second a sample is taken

- higher sampling rate = better quality
- measured in Hertz (Hz). 44,100 samples per second = 44,100 Hz = 44.1 kHz

Sampling resolution - bits used to store each sample

- higher resolution = more data per sample = better quality. CD = 16 bit; DVD = 24 bit

Representing sound

file size = rate x resolution x seconds

e.g. a 3 second sample is recorded at a sample rate of 8 kHz using 16 bit sampling resolution.

$$\text{size} = 8,000 \times 16 \times 3$$

Representing sound

MP3 files are a compressed audio format. The audio is sampled at 44.1kHz.

VOIP is an audio format used for live sound across the internet. It is sampled at 8kHz.

Q. Explain the difference in sound quality and file size between the two ways of representing sound.

Why is this all less of an issue than in the past?

Representing sound

Q. A 20 second voice clip is sampled at 8kHz using 16 bit sampling resolution.

Calculate the resulting file size.

Representing sound

- in Bytes?
- in kilobytes?
- in Megabytes?
- in Gigabytes?
- in Terrabytes?