



F8.8 Sound

Data representation · GCSE · OCR J277 1.2.4, AQA 8525 3.3.7, Edexcel
1CP2 2.2.3 · about 15 min

Name _____

Class _____

Date _____

What this lesson is about

Sampling, sample rate, bit depth and file size, and finding a note from its samples.

- Sampling a wave
- Bit depth
- File size
- From samples back to a note
- Quality and size

Questions

5 marks in all

1. A sound is sampled at 8,000 Hz with an 8-bit depth for 2 seconds. How many bits is it? [1 mark]

2. What is the sample rate? [1 mark]
☐ A The number of samples taken each second
☐ B The number of bits in each sample
☐ C How loud the sound is
☐ D The length of the recording
3. What does increasing the bit depth do? [1 mark]
☐ A Each sample is stored more accurately, and the file gets bigger
☐ B More samples are taken each second
☐ C The sound gets louder
☐ D The file gets smaller
4. A 440 Hz wave crosses the middle going upwards how many times in half a second? [1 mark]

5. How many levels can a 2-bit sample take? [1 mark]

The task: find the note

Sample a note of 659 Hz for half a second at a sample rate of 8,000 Hz. Print `samples: <n>` and `8-bit size: <n> bits`, worked out from the rate and duration. Then count the upward crossings, print `note: <freq> Hz`, and play that frequency on the buzzer for half a second.

```
# the two lines every program starts with: the commands, then the robot
from bugbot import *
connect()

import math

rate = 8000
seconds = 0.5
```

Plan your program here, then type it in and press Run.



Do it on the robot

www.bugbotlab.com/learn/f8-8-sound/

The simulator checks it and tells you when it passes. Nothing to install, no account.

Challenges

1. Sample the same note at 1,000 samples a second. Does the crossing count still find it? Why not?
2. Mix two notes by adding their samples. What does the crossing method report now?
3. How many minutes of 8 kHz, 8-bit sound fit in 1 MB?