



F8.1 Bits, bytes and units

Data representation · GCSE · OCR J277 1.2.3, AQA 8525 3.3.3, Edexcel
1CP2 2.1.1 · about 12 min

Name _____

Class _____

Date _____

What this lesson is about

Why computers use binary, and the units from bits to petabytes.

- Why binary
- Units
- How big is a picture?

Questions

6 marks in all

1. Why do computers store data in binary? [1 mark]

- ☐ A Their circuits are made of switches that are either on or off
- ☐ B Binary uses less electricity than denary
- ☐ C Binary numbers are shorter
- ☐ D It was the first number system invented

2. Put the units in order from smallest to largest. [1 mark]

Number the lines 1 to 7 to put them in the right order.

- ___ nibble
- ___ terabyte
- ___ megabyte
- ___ gigabyte
- ___ kilobyte
- ___ bit
- ___ byte

3. How many bits are in a byte? [1 mark]

4. How many different patterns can 5 bits make? [1 mark]

5. What does this program print? [1 mark]

```
frame_bytes = 320 * 240 * 3
print(frame_bytes, frame_bytes / 1000)
```

6. How many bytes is a kibibyte?

[1 mark]

- ☐ A 1,024
- ☐ B 1,000
- ☐ C 8
- ☐ D 1,000,000

The task: frame sizes

The robot's camera can also capture a small 64 by 48 frame with 3 bytes per pixel. Work out and print three lines: `bits: <n>`, `bytes: <n>` and `kB: <n>` (kilobytes of 1,000 bytes, as a decimal). Store the width, height and bytes per pixel in variables and calculate each line; do not type the answers.

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

width = 64
```

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



Do it on the robot

www.bugbotlab.com/learn/f8-1-bits-bytes-and-units/

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

Challenges

1. How many different colours can a pixel with 24 bits have? Work it out with `**`.
2. How many 1 MB photos fit on a 64 GB memory card? Use 1,000 for each step.
3. Repeat the frame calculation using kibibytes and mebibytes. How big is the difference?