Storage Units

IGCSE Computer Science Revision Sheet

■ **Big Idea:** Storage units measure how much data a computer can store. All storage is based on bits and bytes because computers use binary.

Key Storage Units

Unit	Size	Description	Real-world example
Bit	1 digit — either 0 or 1	Smallest possible unit of data	0 or 1
Nibble	4 bits	Half a byte	1011
Byte (B)	8 bits	Stores one character of text	Letter A
Kilobyte (KB)	1,024 bytes	Very small file	Short text document
Megabyte (MB)	1,024 KB ≈ 1 million bytes	Medium file	Photo or MP3 song
Gigabyte (GB)	1,024 MB ≈ 1 billion bytes	Large file or drive	Movie or video game
Terabyte (TB)	1,024 GB ≈ 1 trillion bytes	Very large storage device	Large hard drive

KEY FACT: 8 bits = 1 byte. Each unit above is 1,024 times larger than the one below it.

Teacher note: The colour gradient reinforces the scale visually. Ask students to cover the Size column and recall each unit's value from memory — a quick but effective drill.

Important Relationships

8 bits	=	1 Byte (B)
1,024 B	=	1 Kilobyte (KB)
1,024 KB	=	1 Megabyte (MB)
1,024 MB	=	1 Gigabyte (GB)
1,024 GB	=	1 Terabyte (TB)

EXAM TIP: The exact value is 1,024 — not 1,000. Cambridge expects 1,024 in calculations. Only use "approximately 1,000" when estimating.

Teacher note: 1,024 = 2¹■. Explain that computers work in powers of 2, which is why storage units use 1,024 rather than 1,000. This also explains why a "1TB" hard drive shows less space in Windows.

Converting Between Units

Conversion	Operation	Example
Larger → Smaller unit	Multiply by 1,024	2 KB = 2 × 1,024 = 2,048 bytes
Smaller → Larger unit	Divide by 1,024	3,072 KB ÷ 1,024 = 3 MB
Bits → Bytes	Divide by 8	40 bits ÷ 8 = 5 bytes
Bytes → Bits	Multiply by 8	5 bytes × 8 = 40 bits

EXAM TIP: Going UP the units (bytes → KB → MB): divide by 1,024. Going DOWN (MB → KB → bytes): multiply by 1,024.

Teacher note: Conversion questions appear regularly. Give students a simple rule: "Bigger unit = fewer of them = divide. Smaller unit = more of them = multiply."

Real-World File Size Examples

Type	File	Typical Size	Context
■	**Text document**	**~10 KB**	A few pages of plain text
■■	**Photograph**	**~3–5 MB**	A typical JPEG image from a phone camera
■	**MP3 song**	**~4–8 MB**	A 3–4 minute audio track
■	**HD movie**	**~4–8 GB**	A full-length film in HD quality
■	**SSD / Hard drive**	**~1–4 TB**	A modern desktop storage device
■	**Video game**	**~50 GB**	A modern AAA game installation

Teacher note: Real-world examples make file sizes tangible. Ask students to estimate the size of their favourite game or a film they watched — it makes the units stick.

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Quick Check Questions

1.	How many bits are in one byte?
2.	How many bytes are in one kilobyte?
3.	Convert 5 MB into KB.
4.	Convert 8,192 bytes into KB.
5.	A file is 2 GB. Convert this into MB.
6.	Which is larger — 500 MB or 0.5 GB? Explain your answer.

Answers on the next page →

Answer Guide

1.	8 bits are in one byte.
2.	1,024 bytes are in one kilobyte.
3.	5 MB × 1,024 = 5,120 KB.
4.	8,192 ÷ 1,024 = 8 KB.
5.	2 GB × 1,024 = 2,048 MB.
6.	They are equal. 0.5 GB × 1,024 = 512 MB, and 500 MB ≈ 512 MB (both are approximately the same size). Accept: they are the same because 0.5 × 1,024 = 512, which is very close to 500 MB.

■ **FutureLogic Summary:** Bit → Nibble (4) → Byte (8) → KB (×1,024) → MB (×1,024) → GB (×1,024) → TB (×1,024). Going UP: divide by 1,024. Going DOWN: multiply by 1,024.