

GCSE Biology

Worksheet: Principles of organisation

TIME 35 min	TOTAL 31 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Principles of organisation

NAME

CLASS

DATE

- Use black ink or black ball-point pen. Pencil should only be used for drawing.
 - Answer all questions in the spaces provided.
 - In all calculations, show clearly how you work out your answer.
 - The marks for questions are shown in brackets.
-

0 1

Multicellular organisms are organised into cells, tissues, organs and organ systems.

0 1 . 1

Figure 1

Level of organisation	Example
Cell	Blood
Tissue	Sperm cell
Organ	A dog
Organ system	The circulatory system
	Heart

Figure 1 shows four levels of organisation and five examples.
Draw **one** line from each level of organisation to an example of that level.

.....

.....

.....

.....

.....

.....

.....

[4 marks]

0 1 . 2

Which is the correct description of an organ?

Tick (✓) **one** box.

A group of cells with a similar structure and function

☐

A group of organs that work together

☐

A group of tissues that work together to perform specific functions

☐

A single cell that is specialised for one function

☐

[1 mark]

0 1 . 3

Name the organ system that pumps blood around the body.

.....

.....

.....

[1 mark]

0 2

Living organisms are organised into different levels.

0 2 . 1

Which shows the levels of organisation in the correct order, from smallest to largest?

Tick (✓) **one** box.

cell → tissue → organ → organ system → organism

☐

tissue → cell → organ → organism → organ system

☐

cell → organ → tissue → organ system → organism

☐

organ → tissue → cell → organ system → organism

☐

[1 mark]

0 2 . 2

What is a **tissue**?

.....

.....

[1 mark]

0 2 . 3

Which of these is an organ?

Tick (✓) **one** box.

Digestive system

☐

Heart

☐

Muscle cell

☐

Muscle tissue

☐

[1 mark]

0 2 . 4

Name the organ system that the stomach is part of.

.....

.....

.....

[1 mark]

0 3

The brain is an organ. A scientist estimated that 1 mm^3 of tissue from an adult brain contains 1.2×10^5 cells. The volume of the adult brain is about 1300 cm^3 .

$$1 \text{ cm}^3 = 1000 \text{ mm}^3$$

0 3 . 1

Estimate the number of cells in the brain.

Give your answer in standard form.

.....

.....

.....

.....

.....

Number of cells =

[3 marks]

0 3 . 2

Suggest **one** reason why this estimate may not be accurate.

.....

.....

[1 mark]

0 4

The roots, stem and leaves of a plant form an organ system that transports substances around the plant.

0 4 . 1

Complete the flow chart to show the levels of organisation in the plant transport system.

xylem cell → _____ (tissue) → _____ (organ) → roots, stem
and leaves (organ system)

.....

.....

.....

.....

[2 marks]

0 4 . 2

A student said:
‘A single xylem cell is a tissue because it transports water.’
Explain why the student is wrong.

.....

.....

.....

.....

[2 marks]

0 4 . 3

Which of these is a plant tissue?

Tick (✓) **one** box.

Guard cell

☐

Leaf

☐

Phloem

☐

Root

☐

[1 mark]

0 4 . 4

Name **two** tissues, other than xylem, found in a leaf.

.....

.....

.....

.....

[2 marks]

0 5

The liver is an organ.

A scientist estimated that 1 mm^3 of liver tissue contains 1.2×10^5 cells.

The volume of an adult liver is about $1.5 \times 10^6 \text{ mm}^3$.

0 5 . 1

Estimate the number of cells in an adult liver.

Give your answer in standard form.

.....

.....

.....

.....

Number of cells =

[2 marks]

0 5 . 2

Suggest **one** reason why this estimate may not be accurate.

.....

.....

[1 mark]

0 5 . 3

Explain why the liver is described as an organ and not as a tissue.

.....

.....

.....

.....

[2 marks]

0 5 . 4

The liver is part of the digestive system.

Name the substance made in the liver that helps with the digestion of fats.

.....

.....

.....

.....

[1 mark]

0 6

The heart is an organ. A scientist estimated that 1 mm^3 of tissue from an adult heart contains 4×10^4 cells. The volume of the adult heart is about 350 cm^3 .

$$1 \text{ cm}^3 = 1000 \text{ mm}^3$$

0 6 . 1

Estimate the number of cells in the heart.

Give your answer in standard form.

.....

.....

.....

.....

.....

Number of cells =

[3 marks]

0 6 . 2

Suggest **one** reason why this estimate may not be accurate.

.....

.....

[1 mark]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Biology · Worksheet: Principles of organisation · 31 marks

Question 1 (6 marks)

01.1 [4 marks]

Answer: cell – sperm cell; tissue – blood; organ – heart; organ system – the circulatory system

- cell – sperm cell (1)
- tissue – blood (1)
- organ – heart (1)
- organ system – the circulatory system (1)

Notes: If more than one line is drawn from a level, award no mark for that level.

01.2 [1 mark]

Correct: A group of tissues that work together to perform specific functions

01.3 [1 mark]

Answer: circulatory system

- circulatory (system) (1)

Notes: Allow cardiovascular system.

Question 2 (4 marks)

02.1 [1 mark]

Correct: cell → tissue → organ → organ system → organism

02.2 [1 mark]

- a group of cells with a similar structure and function (1)
-

02.3 [1 mark]

Correct: Heart

02.4 [1 mark]

Answer: digestive system

- digestive (system) (1)
-

Question 3 (4 marks)

03.1 [3 marks]

Answer: 1.56×10^{11}

- $1300 \text{ cm}^3 = 1\,300\,000 \text{ mm}^3$ (1)
- $1.2 \times 10^5 \times 1\,300\,000$ (1)
- 1.56×10^{11} (1)

Notes: Allow 1.6×10^{11} . 156 000 000 000 (not in standard form) scores 2 marks. An answer of 1.56×10^8 (volume not converted) scores 1 mark.

03.2 [1 mark]

- the number of cells per mm^3 may be different in different parts of the brain / the sample may not be representative / organs vary in size (1)

Question 4 (7 marks)

04.1 [2 marks]

Answer: xylem (tissue); stem / root / leaf (organ)

- xylem (1)
- stem / root / leaf (1)

04.2 [2 marks]

- a tissue is a group of (many) cells with a similar structure and function (1)
- a single xylem cell is a cell; many xylem cells together form xylem tissue (1)

04.3 [1 mark]

Correct: Phloem

04.4 [2 marks]

- epidermis (1)
- palisade mesophyll (1)
- spongy mesophyll (1)
- phloem (1)

Any 2 of the points above.

Question 5 (6 marks)

05.1 [2 marks]

Answer: 1.8×10^{11}

- $1.2 \times 10^5 \times 1.5 \times 10^6$ (1)
- 1.8×10^{11} (1)

05.2 [1 mark]

- the number of cells per mm^3 may be different in different parts of the liver / the sample may not be representative / livers vary in size (1)

05.3 [2 marks]

- the liver contains several different tissues (1)
- which work together to carry out specific functions (1)

05.4 [1 mark]

Answer: bile

- bile (1)
-

Question 6 (4 marks)

06.1 [3 marks]

Answer: 1.4×10^{10}

- $350 \text{ cm}^3 = 350\,000 \text{ mm}^3$ (1)
- $4 \times 10^4 \times 350\,000$ (1)
- 1.4×10^{10} (1)

Notes: 14 000 000 000 (not in standard form) scores 2 marks. An answer of 1.4×10^7 (volume not converted) scores 1 mark.

06.2 [1 mark]

- the number of cells per mm^3 may be different in different parts of the heart / the sample may not be representative / organs vary in size (1)
-