

GCSE Biology

Worksheet: Meiosis

TIME 30 min	TOTAL 30 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Meiosis

NAME	CLASS	DATE
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- 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.

01

In one species of frog, the body cells contain 26 chromosomes.

01.1

Give the number of chromosomes in a gamete of this species.

Number of chromosomes =

[1 mark]

01.2

Name the type of cell division that produces gametes.

[1 mark]

0 2

Cells divide by mitosis or by meiosis, depending on their location and purpose.

0 2 . 1

Which type of cell division produces new cells for growth and repair?

Tick (✓) **one** box.

Fertilisation

☐

Meiosis

☐

Mitosis

☐

Differentiation

☐

[1 mark]

0 2 . 2

Which type of cell division happens only in reproductive organs (ovaries and testes)?

Tick (✓) **one** box.

Binary fission

☐

Differentiation

☐

Meiosis

☐

Mitosis

☐

[1 mark]

0 2 . 3

State **one** similarity between mitosis and meiosis in what happens to the DNA before either type of division begins.

[1 mark]

0 2 . 4

Which **two** statements are true of meiosis?

Tick (✓) **two** boxes.

It produces 2 daughter cells

☐

It produces 4 daughter cells

☐

The daughter cells are genetically identical

☐

The daughter cells are genetically different

☐

[2 marks]

0 3

Gametes are produced by a type of cell division called meiosis.

0 3 . 1

Where does meiosis take place in the human body?

Tick (✓) **one** box.

In the brain

☐

In the ovaries and testes

☐

In the skin

☐

In the stomach

☐

[1 mark]

0 3 . 2

How many cells are produced when one cell divides by meiosis?

Tick (✓) **one** box.

1

☐

2

☐

4

☐

8

☐

[1 mark]

0 3 . 3

Human body cells contain 46 chromosomes.

How many chromosomes are there in a human sperm cell?

.....

.....

.....

[1 mark]

0 3 . 4

After fertilisation, the fertilised egg divides many times to form an embryo.

Name the type of cell division involved.

.....

.....

.....

[1 mark]

0 4

The stages below, involving cell division, happen during human reproduction, but they are in the wrong order.

- A Mitosis produces the millions of cells of a growing embryo.
- B Meiosis in the ovaries and testes produces gametes (eggs and sperm).
- C Fertilisation restores the full number of chromosomes.
- D The fertilised egg (zygote) begins to divide.

0 4 . 1

Write the letters in the correct order.

[2 marks]

0 5

The body cells of a pig contain 38 chromosomes.

0 5 . 1

Give the number of chromosomes in a gamete of this animal.

Number of chromosomes =

[1 mark]

0 5 . 2

Name the type of cell division that produces gametes.

[1 mark]

0 6

A student wrote the following statement:

'Meiosis produces two cells, each with the same number of chromosomes as the parent cell.'

This statement contains two mistakes.

0 6 . 1

Identify the **two** mistakes in the student's statement, and write a correct statement for each.

.....

.....

.....

.....

[2 marks]

0 6 . 2

Are the four cells produced by meiosis genetically identical to each other?
Explain your answer.

.....

.....

.....

.....

[2 marks]

0 7

The body cells of a sheep contain 54 chromosomes.

0 7 . 1

Give the number of chromosomes in each of these cells:

a gamete

a skin cell produced by mitosis

a fertilised egg cell

Give your answers in this order.

.....

[3 marks]

0	7	.	2
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Explain why it is important that gametes contain half the number of chromosomes of a body cell.

[2 marks]

08

Gametes (sex cells) are produced by meiosis.

0	8	.	1
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Describe how meiosis produces four genetically different gametes from one parent cell.

[illegible]

[6 marks]

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: Meiosis · 30 marks

Question 1 (2 marks)

01.1 [1 mark]

Answer: 13

- 13 (1)
-

01.2 [1 mark]

Answer: Meiosis

- meiosis (1)
-

Question 2 (5 marks)

02.1 [1 mark]

Correct: Mitosis

02.2 [1 mark]

Correct: Meiosis

02.3 [1 mark]

Answer: The DNA (genetic information) is copied before the cell divides, in both types of division

- the DNA / genetic information is copied (replicated) before the cell divides, in both types (1)
-

02.4 [2 marks]

Correct: It produces 4 daughter cells; The daughter cells are genetically different

Question 3 (4 marks)

03.1 [1 mark]

Correct: In the ovaries and testes

03.2 [1 mark]

Correct: 4

03.3 [1 mark]

Answer: 23

- 23 (1)
-

03.4 [1 mark]

Answer: Mitosis

- mitosis (1)
-

Question 4 (2 marks)

04.1 [2 marks]

Answer: B, C, D, A

- B first and A last (1)
 - C before D (1)
-

Question 5 (2 marks)

05.1 [1 mark]

Answer: 19

- 19 (1)
-

05.2 [1 mark]

Answer: Meiosis

- meiosis (1)
-

Question 6 (4 marks)

06.1 [2 marks]

Answer: Meiosis produces four cells, not two; each new cell has half the number of chromosomes of the parent cell, not the same number

- meiosis produces **four** cells, not two (1)
 - each new cell has **half** the number of chromosomes of the parent cell, not the same number (1)
-

06.2 [2 marks]

Answer: No, they are genetically different from each other, because each cell receives a different, random combination of chromosomes (one from each pair)

- no, they are genetically different from each other (1)
 - each cell receives a different, random combination of chromosomes (one chromosome from each pair) (1)
-

Question 7 (5 marks)

07.1 [3 marks]

Answer: 27; 54; 54

- gamete: 27 (1)
 - skin cell: 54 (1)
 - fertilised egg cell: 54 (1)
-

07.2 [2 marks]

Answer: So that when two gametes join at fertilisation, the normal number of chromosomes is restored, rather than doubling every generation

- so that when gametes join at fertilisation the normal / full number of chromosomes is restored (1)
 - otherwise the chromosome number would double in each generation (1)
-

Question 8 (6 marks)

08.1 [6 marks]

Levels of response

- **Level 3 (5–6)** A detailed, coherent answer. Relevant points are accurate, linked in a logical sequence and use correct scientific terms.
- **Level 2 (3–4)** Several relevant points with some linking, but the answer has gaps, errors or lacks detail.
- **Level 1 (1–2)** Simple statements making one or two relevant points, with little or no linking.
- **No marks (0)** Nothing relevant or worthy of credit.

Indicative content

- before meiosis begins, copies of the genetic information (DNA / chromosomes) are made
- the cell then divides twice
- in the first division, the chromosome pairs (one chromosome of each pair from each parent) are separated, one chromosome from each pair going to each new cell
- in the second division, the two copies of each chromosome are separated
- this gives four cells, each with a single set of chromosomes — half the number in the parent cell
- the four cells are genetically different from each other, because the chromosomes of each pair are shuffled / separated at random into the new cells
- these cells develop into gametes (sperm or egg cells in animals, pollen or egg cells in plants); at fertilisation two gametes fuse and the normal number of chromosomes is restored

Notes: Level 3 (5–6 marks): describes copying of the genetic information and both divisions in a logical sequence, AND explains why the cells have a single set of chromosomes and are genetically different. Level 2 (3–4 marks): describes some stages of meiosis, with gaps or limited explanation of the variation. Level 1 (1–2 marks): simple, isolated statements, e.g. 'meiosis makes gametes', without describing the process. Ignore 'haploid', 'diploid' and 'chromatids': not required, but credit correct use.
