

GCSE Combined Science: Trilogy

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.

This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

[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 Combined Science: Trilogy · 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.
