SCIENCE FOUNDATIONS

Mitosis

Difficulty level: Intermediate

Science Foundations

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Overview of the concept

This is how a scraped knee heals and a child grows taller, because one cell copies itself and splits into two identical cells again and again. Your skin replaces itself constantly, which is why a paper cut closes in a few days. A plant grows new leaves the same way, by dividing cells at the tips of its shoots. Knowing mitosis tells you how your body repairs damage and grows, with every new cell carrying the same instructions as the one it came from.

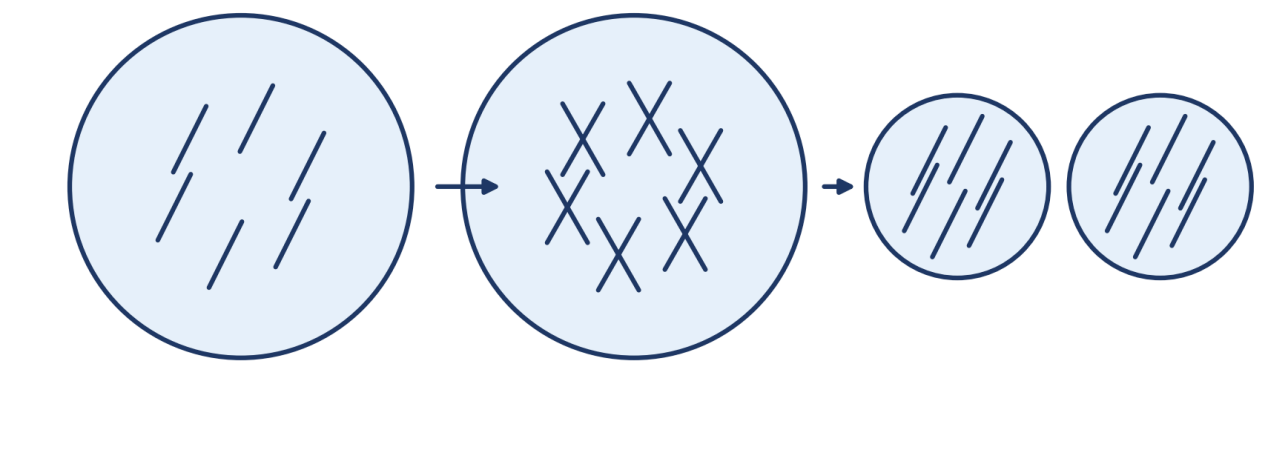


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Worked examples

EXAMPLE 1

Q Trace mitosis: one diploid cell with 6 chromosomes.



SOLUTION

Copy first: chromosomes duplicate, still one cell.

Separate: sister chromatids pull apart in anaphase.

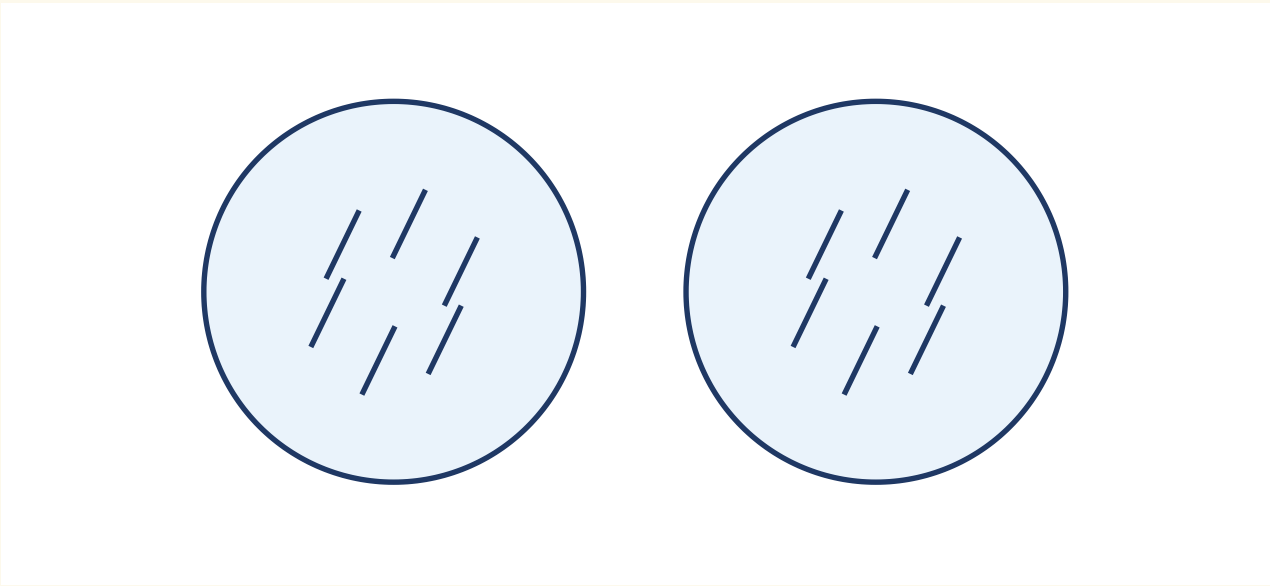
Divide: two cells form, each with 6 chromosomes.

The result is two identical cells, each with 6 chromosomes.

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EXAMPLE 2

Q How many cells does mitosis make, and are they identical?



SOLUTION

Count the products: mitosis makes two cells.

Compare chromosomes: each keeps the parent number.

Conclude: two identical diploid cells.

The result is two identical diploid cells.

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Practice questions

1 **Trace mitosis in a diploid cell with 10 chromosomes. How many cells form, how many chromosomes does each have, and are they identical to the parent?**

- **A** Two identical diploid cells, each with 10 chromosomes
- **B** Four haploid cells, each with 5 chromosomes
- **C** Two identical cells, each with 5 chromosomes
- **D** Four identical cells, each with 10 chromosomes

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2

Trace mitosis in a diploid cell with 8 chromosomes. How many cells form, and how many chromosomes does each have?

A Four haploid cells, each with 4 chromosomes

B Two identical cells, each with 8 chromosomes

C Two identical cells, each with 4 chromosomes

D Four identical cells, each with 8 chromosomes

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3

Why do the two cells from mitosis have the same chromosome number as the parent?

A The chromosomes are split in half between the cells

B The chromosomes are copied before division, so each new cell gets a full set

C Only one cell gets chromosomes

D The chromosome number doubles with each division

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4

How many cells does mitosis make, and does the chromosome number change? Explain.

A Four cells, and the chromosome number stays the same

B Two cells, and the chromosome number halves

C Two cells, and the chromosome number stays the same

D Four cells, and the chromosome number halves

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5 List the stages of mitosis in order.

- **A** Prophase, metaphase, anaphase, telophase
- **B** Prophase, anaphase, metaphase, telophase
- **C** Metaphase, prophase, anaphase, telophase
- **D** Telophase, anaphase, metaphase, prophase

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6 What happens in anaphase?

- **A** Chromosomes copy
- **B** Sister chromatids pull apart
- **C** The nucleus reforms
- **D** Chromosomes line up in the middle

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7 What happens before division starts in mitosis?

A Sister chromatids pull apart

B The cell splits in two

C Chromosomes copy

D Chromosomes line up in the middle

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8 What is mitosis used for?

A Making gametes

B Growth, repair, and asexual reproduction

C Growth, repair, and making gametes

D Making gametes and sexual reproduction

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9 **One skin cell divides by mitosis to heal a cut. After three rounds of mitosis starting from that one cell, how many cells are there?**

- A 3 cells
- B 6 cells
- C 8 cells
- D 16 cells

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10 **Mitosis or meiosis: which makes body cells for growth?**

- A Mitosis
- B Meiosis

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ANSWER KEY

1. Two identical diploid cells, each with 10 chromosomes
2. Two identical cells, each with 8 chromosomes
3. The chromosomes are copied before division, so each new cell gets a full set
4. Two cells, and the chromosome number stays the same
5. Prophase, metaphase, anaphase, telophase
6. Sister chromatids pull apart
7. Chromosomes copy
8. Growth, repair, and asexual reproduction
9. 8 cells
10. Mitosis

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