

What is Meiosis and Sexual Reproduction?

Worksheet

Meiosis is two consecutive divisions (Meiosis I and II) that reduce chromosome number by half and mix genetic material. This creates sperm and eggs with 23 chromosomes, ready to fuse at fertilization.

Questions

1. Meiosis produces

- A) 2 diploid cells
- B) 4 haploid cells
- C) 1 haploid cell
- D) 8 cells

2. A gamete has 23 chromosomes. Its parent cell had

- A) 23 chromosomes
- B) 46 chromosomes
- C) 69 chromosomes
- D) 11.5 chromosomes

3. Crossing over increases

- A) cell size
- B) chromosome number
- C) genetic variation
- D) division speed

4. Meiosis II is similar to

- A) Meiosis I
- B) mitosis
- C) fertilization
- D) interphase

5. A human diploid cell has 46 chromosomes. After meiosis, how many are in each gamete?

6. Why is crossing over important in meiosis?

7. How many gametes result from one diploid cell?

8. Define: What is meiosis?

9. Define: How many divisions occur in meiosis?

10. Define: What is a haploid cell?

Answer Key

1. B) 4 haploid cells - One diploid cell divides twice, yielding 4 haploid gametes.
2. B) 46 chromosomes - Meiosis halves chromosome number: 46 → 23.
3. C) genetic variation - Crossing over mixes alleles, creating genetic diversity.
4. B) mitosis - Meiosis II separates sister chromatids, like mitosis.
5. Diploid ($2n$) = 46. After meiosis: haploid (n) = 23. Each sperm and egg has 23 chromosomes.
6. Homologous chromosomes exchange segments in Prophase I. This creates genetic variation - no two gametes are identical. Essential for offspring diversity.
7. One cell → 4 haploid gametes. In males: 4 functional sperm. In females: 1 functional egg + 3 polar bodies (in animals).
8. A reduction division producing 4 haploid gametes from 1 diploid cell.
9. Two: Meiosis I (reduction) and Meiosis II (separation of sister chromatids).
10. A cell with half the chromosome number of the parent ($n = 23$ in humans).

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