What is Meiosis and Sexual Reproduction?

Worksheet

Meiosis is reduction division: a diploid cell (2n) divides twice to form four haploid gametes (n). Homologous chromosomes pair and exchange genetic material (crossing over), then segregate, producing genetic variation essential for evolution and species survival.

Questions

1. In humans, meiosis reduces chromosome number from 46 to:

A) 23
B) 46
C) 92
D) 184

2. Crossing over takes place during:

A) Metaphase II
B) Prophase I
C) Anaphase II
D) Telophase I

3. Sister chromatids separate during:

A) Meiosis I
B) Anaphase I
C) Meiosis II
D) Telophase I

4. How many gametes result from one meiotic event?

A) 1
B) 2
C) 3
D) 4

5. A human cell with 46 chromosomes undergoes meiosis. How many chromosomes in each gamete?

6. Crossing over occurs during which phase of meiosis?

7. From one diploid cell, how many genetically distinct haploid gametes are produced?

8. Define: What is meiosis?

9. Define: How many divisions occur in meiosis?

10. Define: What is crossing over?

Answer Key

1. A) 23 - From diploid (2n=46) to haploid (n=23). Each gamete has one set.
2. B) Prophase I - Prophase I: homologs synapse and non-sister chromatids exchange segments.
3. C) Meiosis II - Meiosis II, specifically Anaphase II, when sister chromatids move to opposite poles.
4. D) 4 - Two consecutive divisions produce four haploid cells.
5. Diploid human cell = 2n = 46 After Meiosis I: n = 23 (one set) After Meiosis II: gamete = 23 chromosomes
6. Prophase I of Meiosis I Homologous chromosomes pair (synapsis) Non-sister chromatids exchange alleles This increases genetic variation
7. Meiosis produces 4 haploid cells Crossing over + independent assortment = each is genetically unique
8. Reduction division producing four genetically unique haploid gametes (n) from one diploid cell (2n).
9. Two: Meiosis I (homologous separation) and Meiosis II (sister chromatid separation).
10. Exchange of genetic material between homologous chromosomes during Prophase I, increasing genetic variation.