

Module 08: Meiosis — Study Questions

Purpose of Meiosis

1. What is the main purpose of meiosis?
2. What type of cells are produced by meiosis? What are they called?
3. Why is it necessary for gametes to be haploid rather than diploid?
4. What would happen to the chromosome number in offspring if gametes were diploid?
5. How does meiosis contribute to genetic diversity in sexually reproducing organisms?

Mitosis vs. Meiosis

1. What are the main differences between mitosis and meiosis?
2. How many cell divisions occur in meiosis? How does this compare to mitosis?
3. Why does meiosis result in four cells while mitosis results in two?
4. At what point in the human life cycle does meiosis occur?
5. How are the daughter cells of meiosis different from the daughter cells of mitosis?

Stages of Meiosis

1. What are the stages of meiosis I? What happens during each?
2. What is the key event that distinguishes meiosis I from meiosis II?
3. During which phase of meiosis do homologous chromosomes pair up?
4. What is a tetrad, and when is it formed?
5. In meiosis I, homologous chromosomes separate. What separates during meiosis II?

6. After meiosis I, are the cells diploid or haploid? Why?
7. How is metaphase II of meiosis similar to metaphase of mitosis?

Genetic Variation

1. What is crossing over, and when does it occur?
2. How does crossing over increase genetic variation?
3. What is independent assortment?
4. Humans have 23 pairs of chromosomes. How many different combinations of chromosomes could a single individual produce in their gametes through independent assortment alone?
5. How does random fertilization add to the genetic variation produced by meiosis?
6. Why is genetic variation important for the survival of species?

Errors in Meiosis

1. What is nondisjunction, and when can it occur?
2. What is the result if nondisjunction occurs during meiosis I versus meiosis II?
3. What is trisomy? Give an example of a condition caused by trisomy.
4. What is monosomy, and why is it often more harmful than trisomy?
5. How might maternal age affect the likelihood of nondisjunction?