Module 08: Meiosis — Keys to Success

Key Learning Objectives

1. Purpose of Meiosis

- Explain why sexual reproduction requires meiosis
- Describe the role of meiosis in producing gametes
- Understand the importance of maintaining chromosome number across generations

2. Comparison with Mitosis

- Compare and contrast mitosis and meiosis
- Explain why meiosis produces four haploid cells while mitosis produces two diploid cells
- Identify when each type of division occurs in the life cycle

3. Stages of Meiosis

- Describe the events of meiosis I and meiosis II
- Explain what happens during each phase (prophase, metaphase, anaphase, telophase)
- Understand the difference between homologous chromosome separation and sister chromatid separation

4. Genetic Variation Mechanisms

- Explain crossing over and when it occurs
- Describe independent assortment and its effect on genetic combinations
- Understand random fertilization and its contribution to variation
- Calculate possible chromosome combinations

5. Errors in Meiosis

- Define nondisjunction and its consequences

- Explain how chromosomal abnormalities arise
- Describe conditions caused by abnormal chromosome numbers (e.g., Down syndrome)

Study Tips

1. **Create side-by-side comparisons** of mitosis and meiosis
2. **Draw diagrams** of each meiosis stage
3. **Practice calculating** genetic combinations
4. **Use colored models** to visualize crossing over
5. **Connect concepts** to inherited genetic disorders