

Chapter 10 Reading Guide: Meiosis and Sexual Life Cycles

How to use this reading guide: Look over the entire reading guide—read each question to prepare yourself for reading the chapter. Read the chapter carefully and thoroughly. Make sure to look at all of the figures and pictures and read their captions. Then...answer the questions posed below.

1. How are the terms heredity, variation and genetics related?
2. Describe some of things you will learn in this unit on Genetics.

Offspring acquire genes from parents by inheriting chromosomes

3. Explain what genes are made of and how inherited information is passed on and “translated.”
4. What are gametes? How are gametes related to the process of replication?
5. Relate the term “locus” to the word gene.
6. Compare asexual reproduction to sexual reproduction.
 - a. How do they relate to the word “clone”?
 - b. Explain how variation is involved/introduced in each type?

Fertilization and meiosis alternate in sexual life cycles

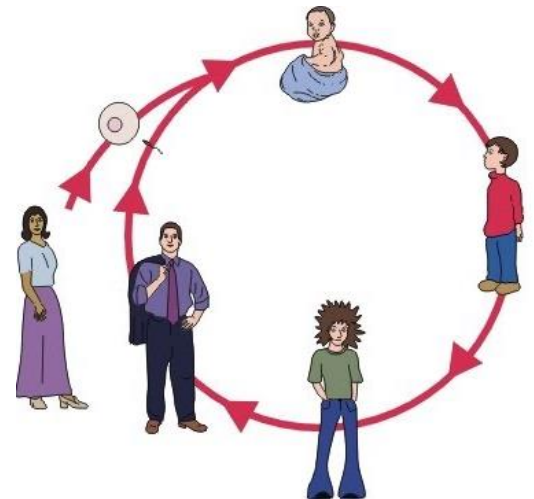
7. What is a life cycle?
 - a. What do we track in a life cycle?
8. Distinguish between somatic cells and gametes.
9. Humans have 46 chromosomes. In what ways do they differ from each other?
10. What is a karyotype?
 - a. What can they be used for?
 - b. How are they prepared?

11. Describe homologous pairs.
- What are they?
 - What do they have in common?
 - How are the X and Y different?

12. Distinguish between the following pairs of words.
- Autosomes & sex chromosomes
 - Haploid & diploid

13. Describe the differences between homologous chromosomes, sister chromatids, non-sister chromatids, and chromosome sets.

14. Using the image at right of the human life cycle, explain the behavior of the chromosomes.
- On the diagram show when the following processes are taking place: meiosis, fertilization, mitosis.
 - Using n (haploid) and $2n$ (diploid), label the Diagram to show how many sets of Chromosomes at each stage.



15. While we have used the human life cycle as an introduction to life cycles, there is variety.
- Draw a diagram which shows “alternation of generations” (be sure to label the diploid and haploid stages and to identify the processes of meiosis, fertilization, and mitosis)
 - How is this life cycle different from the Animal life cycle?

16. Most fungus, some protists, and some algae undergo a third type of life cycle. How is this one different from the other three?

17. What "fundamental result" is shared by all life cycles regardless of type?

Meiosis reduces the number of chromosome sets from diploid to haploid

18. IN ONE SENTENCE..what is similar and different between mitosis and meiosis?

19. KNOW FIGURE 10.8!!!!

Interphase: _____ occurs during _____, meaning that there are now _____ (for a human) chromosomes each with _____ chromatids.

Meiosis I: Describe it in one sentence:

- a. **Prophase I:** _____ chromosome pairs are aligned_____. _____ may occur between non-sister chromatids. These places are known as _____. The _____ forms between homologous pairs.
- b. **Metaphase I:** Homologous pairs of chromosomes are referred to as _____ at this point. They are arranged _____. Microtubules from the spindle are attached_____.
- c. **Anaphase I:** _____ are separated as homologous pairs of chromosomes move to opposite sides. The _____ remain attached.
- d. **Telophase I and Cytokinesis I:** Each half of the cell, at the beginning of telophase has a _____ set of chromosomes; but each chromosome still consists of _____. Cytokinesis produces two daughter cells. This stage is NOT followed by_____.
 - i. What would happen if this DID happen? Why is this not a good thing?

Meiosis II: Describe it in one sentence:

- a. **Prophase II:**
- b. **Metaphase II:** The chromosomes are lined up on the metaphase plate. The sister chromatids are not identical anymore. Why?
 - i. What straddles the metaphase plate?
- c. **Anaphase II:** The _____ come apart at this time.
- d. **Telophase II and Cytokinesis II:** At the end of these phases, there are _____ daughter cells which are _____ and _____ from the parent cell.

A Comparison of Mitosis and Meiosis

20. How are mitosis and meiosis similar?

21. What events are distinctly unique to meiosis? Be Specific!!! Be Detailed!!!

Genetic variation produced in sexual life cycles contributes to evolution

22. What introduces novel (completely brand new) variation into a gene pool?

23. How do the behavior of chromosomes account for variation seen in most populations?

24. Explain what the term "Independent Assortment" means.
 - a. How does this contribute to variation?
 - b. Draw a picture (or two) which helps illustrate your point.

25. Define the term, "recombinant chromosome."
 - a. Explain how they are made.

 - b. How does crossing over interact with independent assortment to increase variation?

26. How does random fertilization account for variation?

27. Why is variation important in evolutionary terms? GO BEYOND THE IDEA OF "SURVIVAL"!!!