

Chapter 13 Guided Reading: Meiosis and Sexual Life Cycles

10ed

1. A little review, **define** the following terms:
 - a. gene
 - b. locus
 - c. gametes
 - d. male gamete
 - e. female gamete
 - f. somatic cells
 - g. genome
 - h. sexual reproduction
 - i. asexual reproduction
2. **How** many chromosomes are in human cells? _____
3. **Which** type of reproduction will result in genetically identical offspring?

4. **How** does a somatic cell compare to a gamete in terms of chromosome number?
5. **What** is a *karyotype*? **How** is it prepared?
6. **What** are two things that can be determined from a karyotype? (Fig 13.3 is helpful)
7. **Explain** what is meant by *homologous chromosomes*.

8. **Distinguish** between sex chromosomes and autosomes. **How** many of each are found in human cells?

	Description	# in Human Cells
Sex chromosome		
Autosome		

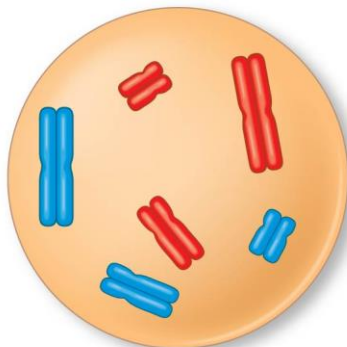
9. Cells that have only one of each homologous pair are said to be haploid, a condition that is represented by n . Cells that have two of each homologous pair are said to be diploid or $2n$. For each of the following, is the cell **haploid** or **diploid**?

liver cell _____ gamete _____ egg cell _____
 zygote _____ skin cell _____ sperm _____
 somatic cell _____ stem cell _____

10. The muscle cells of a dog have 78 chromosomes. **Fill** in the correct chromosome number for the following cells in a dog.

bone cell _____, sperm _____, haploid cell _____, somatic cell _____, and zygote _____.

11. In the cell below, the chromosomes are shaded in two colors to represent the parent of origin. On this sketch, **label** the following: **sister chromatids**, **homologous chromosomes**, **centromere**, **replicated chromosomes**, **maternal chromosomes** and **paternal chromosomes**.

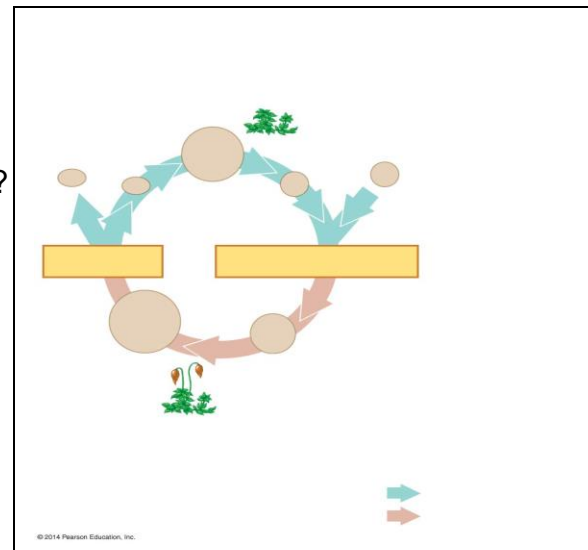


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12. **How** many chromosomes does the above cell have? _____
How many homologous pairs? _____
How many chromatids? _____
 Is this cell **haploid (n)** or **diploid (2n)**? _____
13. **Where** are the gametes of an animal produced? Be specific as to male and female gametes.
14. By **what process** are gametes produced? _____
15. Look at Fig 13.6 in your text. Plants have a life cycle that involves spores, which form as a result of _____ so these spores are haploid. **Both** haploid and diploid cells can divide by mitosis. However, meiosis begins with cells that are _____, and as a result of meiosis, daughter cells are formed that are always _____. These cells can be gametes (in animals) or spores (in plants).

16. Your study of plants this year will include knowing that they exhibit alternation of generations.

- What** does this mean?
- What** are the two generations?
- Which** generation is haploid, and which is diploid?
- Use this information to **label** the moss life cycle.

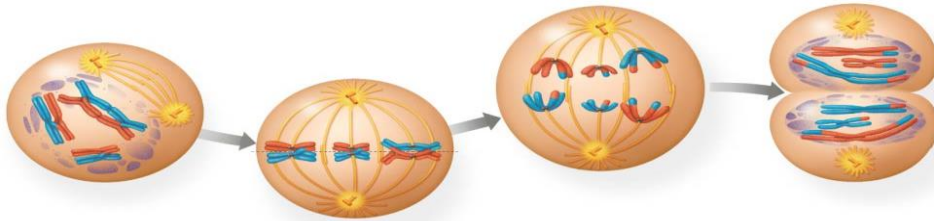


17. **What** are alleles? Give an **example**.

18. In meiosis, the DNA is replicated during interphase, followed by two divisions. The first division is meiosis I. Use figure 13.8 and the reading to study the events of prophase I, as they are significant. **Explain** each of these:

Synapsis

Chiasmata



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19. **Label** the figure above. The figure shows metaphase I. **How** is the arrangement of chromosomes different from the metaphase of mitosis?

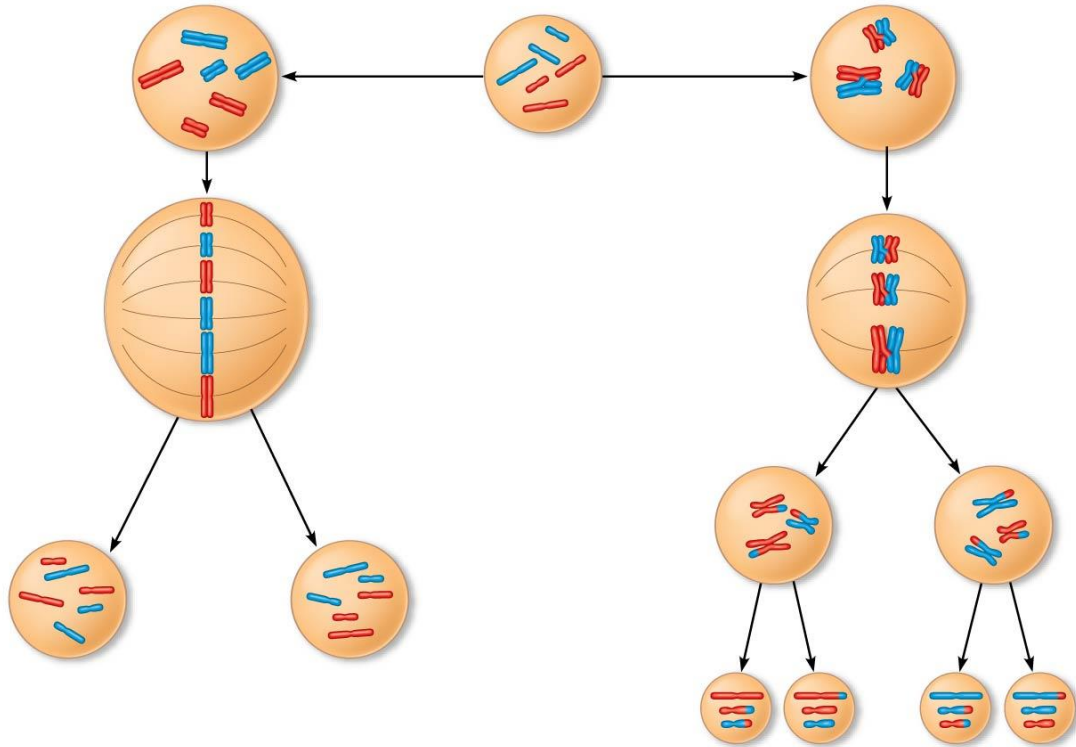
20. Now study the chromosomes in *anaphase I* and *telophase I*. **How** many chromosomes are in each cell at the end of the first meiotic division? _____

21. Are the resultant daughter cells **haploid** or **diploid**? _____

22. During Meiosis I, homologous chromosomes separate. **What** separates during Meiosis II?

23. **Explain** the physical events of crossing over. Include a sketch of the event. **Include** these terms in your discussion: *synaptonemal complex*, *chiasmata*, *homologs* and *sister chromatids*.

24. Use figure 13.10 in your text to compare mitosis and meiosis. **Add these labels:** *parent cell, mitosis, meiosis, synapsis, homologous chromosomes, replicated chromosomes, sister chromatids, daughter cells, meiosis I, meiosis II and crossing over.*



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25. **Fill out** the following chart about the differences between mitosis and meiosis.

	Mitosis	Meiosis
Role in the animal body		
Number of DNA replications		
Number of divisions		
Number of daughter cells		
Chromosome number of daughter cells		

26. An important idea to understand is that new alleles arise by changes in the DNA or mutation, but genetic diversity occurs when the deck is simply reshuffled. So, there are three ways that sexually reproducing organisms “shuffle the deck”. **Explain** how this increases diversity.

Independent assortment of chromosomes

Crossing over

Random fertilization

27. “Why sex?” Any individual passes on more of its genes through asexual reproduction, so there must be some advantage to sexual reproduction, as it is almost universal among animals. **Under what conditions** is sexual reproduction most advantageous and **why**?

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