

CHAPTER 10
Section 1: Meiosis

Study Guide

In your textbook, read about meiosis I and meiosis II.

Label the diagrams below. Use these choices:

- anaphase I anaphase II interphase metaphase I metaphase II
 prophase I prophase II telophase I telophase II

1. _____ 2. _____ 3. _____ 4. _____ 5. _____



6. _____ 7. _____ 8. _____ 9. _____

Complete the table by checking the correct column(s) for each description.

Description	Mitosis	Meiosis
10. Involved in the production of gametes		
11. Involved in growth and repair		
12. Promotes genetic variation in organisms		
13. Consists of one nuclear division		
14. Produces daughter cells that are genetically identical		
15. Involves two sets of nuclear divisions		
16. Produces daughter cells that are not identical		
17. Involves the synapsis of homologous chromosomes		
18. Occurs during asexual reproduction		
19. Results in four haploid gametes		
20. Also called <i>reduction division</i>		

Section 1 Meiosis (continued)

Main Idea

Chromosomes and Chromosome Numbers

I found this information on page _____.

Meiosis I, Meiosis II, and The Importance of Meiosis

I found this information on page _____.

Details

Identify *three characteristics that are the same in each member of a pair of homologous chromosomes. Name one thing that is different.*

Same	Different
1.	1.
2.	
3.	

Compare and contrast *the phases of Meiosis I and Meiosis II. Sketch each phase.*

Meiosis I	Prophase I	Metaphase I	Anaphase I	Telophase I
Description				
Sketch				
Meiosis II	Prophase II	Metaphase II	Anaphase II	Telophase II
Description				
Sketch				

Analyze *the chart above to determine the phase of meiosis when crossing over can occur. Mark a star on the correct phase.*

Study Guide

CHAPTER 10

Section 2: Mendelian Genetics

In your textbook, read about how genetics began and the inheritance of traits.

Write the term or phrase that best completes each statement. Use these choices:

cross-pollination
recessive

dominant
self-fertilization

gametes
trait

inherited

- Mendel was the first person to succeed in predicting how traits are _____ from generation to generation.
- In peas, both male and female sex cells, which are called _____, are in the same flower.
- _____ occurs when a male gamete fuses with a female gamete in the same flower.
- Mendel used the technique called _____ to breed one plant with another.
- Mendel studied only one _____ at a time and analyzed his data mathematically.
- In individuals with a heterozygous genotype, the _____ allele of a trait is hidden by the expression of the other phenotype.
- In individuals with a heterozygous genotype, the _____ allele of a trait is visible in the phenotype.

In your textbook, read about Punnett squares.

Complete the Punnett square by filling in the missing information.

A student crossed true-breeding pea plants that had purple flowers (P) with true-breeding pea plants that had white flowers (p). All of the offspring had purple flowers. Then the student crossed two plants from the F_1 generation. The student's Punnett square is shown at right. What information should the student put in each blank? Remember, the dominant allele is always written first.

Possible gametes

8. _____ p

9. _____

	10.	11.
Pp		12.

p

Study Guide, Section 2: Mendelian Genetics continued

In your textbook, read about the inheritance of traits and Punnett squares.

Use each of the terms below only once to complete the passage.

dihybrid gene genotypes monohybrid phenotypic ratio

A cross between plants that involves one characteristic is called a (13) _____ cross. Mendel also performed (14) _____ crosses, which involve two (15) _____ pairs, with pea plants. When he crossed two pea plants that were heterozygous for both seed shape (Rr) and for seed color (Yy), he observed a 9:3:3:1 (16) _____ among the seeds of the offspring. A Punnett square shows the possible phenotypes and (17) _____ of the offspring.

Complete the Punnett square by filling in the missing information.

Possible gametes	RY	Ry	rY	ry
RY	$RRYY$ round, yellow	18.	19.	$RrYy$ round, yellow
Ry	20.	21.	22.	23.
rY	24.	$RrYy$ round, yellow	25.	26.
ry	27.	28.	29.	30.

In your textbook, read about probability.

Refer to the Punnett square above. Respond to the following statement.

31. Find the probability that a wrinkled, green seed will result. _____

Section 2 Mendelian Genetics (continued)

Main Idea

I found this information on page _____.

Punnett Squares and Probability

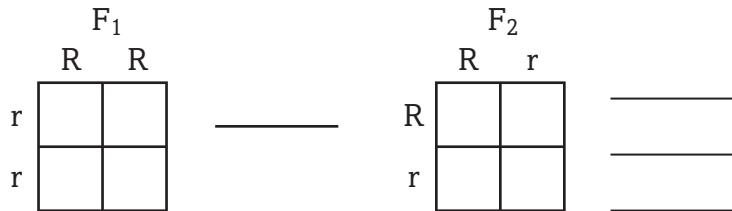
I found this information on page _____.

Details

Demonstrate the law of independent assortment by listing the 4 alleles that are produced when a pea plant with the genotype $YyRr$ produces gametes.

1. _____ 2. _____ 3. _____ 4. _____

Complete the Punnett squares for seed texture in the F_1 and F_2 generations. Round seeds (R) are dominant over wrinkled seeds (r). Write the expected genotypes and the probability for each.



Identify the genotypes within the Punnett square showing the dihybrid cross of seed color and seed texture. The first row has been done for you. Write the expected phenotypic ratio.

	YR	yR	Yr	yr
YR	YYRR	YyRR	YYRr	YyRr
yR				
Yr				
yr				

Phenotypic ratio: _____

SUMMARIZE

Discuss the effects of Mendel's two laws (segregation and independent assortment). Give an example.

Study Guide

CHAPTER 10

Section 3: Gene Linkage and Polyploidy

In your textbook, read about genetic recombination and gene linkage.

Match the definition in Column A with the term in Column B.

Column A

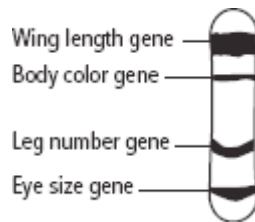
- _____ 1. genes that are located on the same chromosome
- _____ 2. shows the location of several genes
- _____ 3. *Drosophila melanogaster*
- _____ 4. an outcome of independent assortment

Column B

- A. chromosome map
- B. genetic recombination
- C. linked genes
- D. fruit fly

For each statement below, write true or false.

- _____ 5. Crossing over occurs more frequently between genes that are close together on a chromosome.
- _____ 6. Gene linkage was first studied by using garden peas.



- _____ 7. Scientists call a drawing like the one shown above a chromosome map.
- _____ 8. Chromosome map percentages represent actual chromosome distances.

In your textbook, read about polyploidy.

Respond to each statement.

- 9. **Recall** the name for the occurrence of one or more extra sets of all the chromosomes in an organism's cells.

- 10. **State** the term for an organism with the chromosome designation $3n$.

Copyright © Glencoe/McGraw-Hill, a division of The McGraw-Hill Companies, Inc.