Name _____ Date _____ Class _____

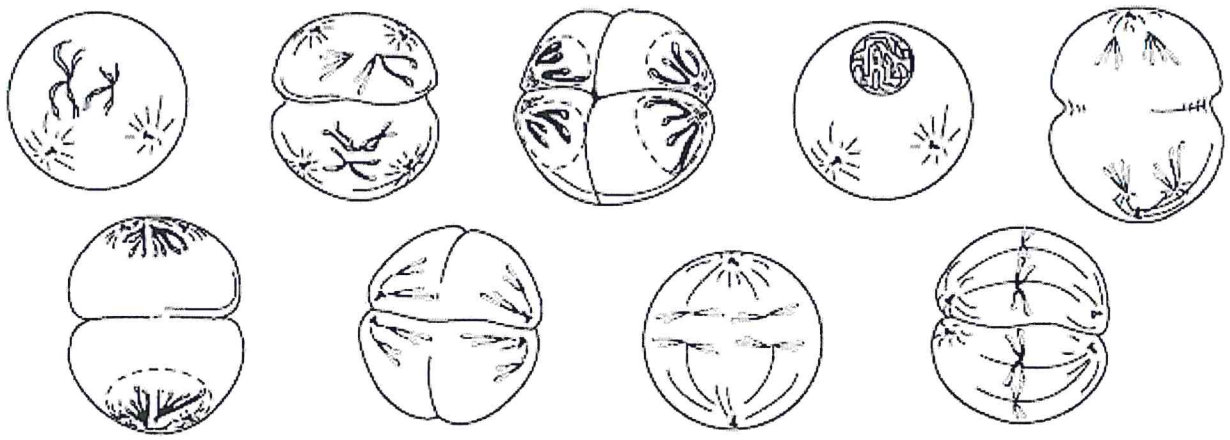
Study Guide

CHAPTER 10
Section 1: Meiosis

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

Label the diagrams below.

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 *reduction division*		

Name _____ Date _____ Class _____

Section Quick Check

CHAPTER 10

Section 1: Meiosis

After reading the section in your textbook, respond to each statement.

1. **Define** *gene.*

2. **List** the stages of meiosis I.

3. **Compute** the number of chromosomes that the gametes of a cat ($2n = 38$ chromosomes) will have. Show your work.

4. **Compare** and **contrast** anaphase I and anaphase II.

5. **Devise** a theory that explains why the most complex animals only reproduce sexually.

Name _____ Date _____ Class _____

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.

1. Mendel was the first person to succeed in predicting how traits are _____ from generation to generation.
2. In peas, both male and female sex cells, which are called _____, are in the same flower.
3. _____ occurs when a male gamete fuses with a female gamete in the same flower.
4. Mendel used the technique called _____ to breed one plant with another.
5. Mendel studied only one _____ at a time and analyzed his data mathematically.
6. In individuals with a heterozygous genotype, the _____ allele of a trait is hidden by the expression of the other phenotype.
7. 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.**
p	*Pp*	**12.**

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

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

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. _____

Name _____ Date _____ Class _____

Section Quick Check

CHAPTER 10

Section 2: Mendelian Genetics

After reading the section in your textbook, respond to each statement.

1. **Identify** the function of Punnett squares.

_____

_____

_____

2. **Describe** how Mendel showed that the green-seed trait did not disappear but was only masked.

_____

_____

_____

3. **Discuss** how meiosis relates to Mendel's law of segregation.

_____

_____

_____

_____

4. **Apply** A white rooster (*WW*) is crossed with a black-and-white-speckled hen (*Ww*). The hen lays eight eggs. Draw a Punnett square to show the possible genotypes of the chicks that will hatch.

5. **Evaluate** A red-flowered plant was crossed with a white-flowered variation of the plant. All of the flowers on the next generation of plants were red. Decide which flower color is recessive for this plant and which is dominant.

_____

_____

Name _____ Date _____ Class _____

Study Guide

CHAPTER 10
Section 3: Gene Linkage and Polyploidy

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

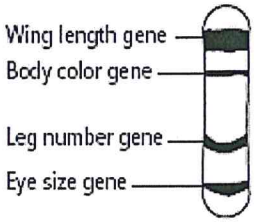
Match the definition in Column A with the term in Column B.

Column A		Column B
_____	**1.** genes that are located on the same chromosome	**A.** chromosome map
_____	**2.** shows the location of several genes	**B.** genetic recombination
_____	**3.** *Drosophila melanogaster*	**C.** linked genes
_____	**4.** an outcome of independent assortment	**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 $3n$.

_____

Name _____ Date _____ Class _____

Section Quick Check

CHAPTER 10

Section 3: Gene Linkage and Polyploidy

After reading the section in your textbook, respond to each statement.

1. **Define** *genetic recombination.*

2. **Explain** why genes close together on the same chromosome are said to be linked.

3. **Demonstrate** the use of the mathematical formula for finding the number of possible combinations of chromosome pairs that can be made in an organism. Use an organism with diploid cells that have five pairs of chromosomes for your demonstration.

4. **Deduce** how two genes for different traits that are on the same chromosome can fail to be inherited together.

5. **Hypothesize** one way that a diploid organism could have offspring that are $3n$ or $4n$.

Biologist _____ Date _____

Oompa Loompa Genetics & Others

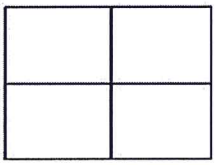
Punnett Square Practice (Monohybrid: Complete Dominance, Incomplete Dominance & Dihybrid)

Complete Dominance

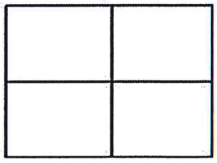
1. Oompas generally have gray faces, which is caused by a dominant gene. The recessive condition results in an orange face. Develop a key to show the possible genotypes and phenotypes for the oompa's face colors.

_____= GRAY FACE _____=GRAY FACE _____=ORANGE FACE

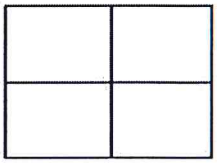
2. Two heterozygous oompa's are crossed. What percentage of the offspring will have orange faces?



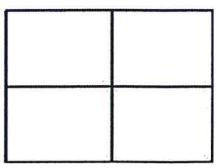
3. A gray-faced oompa (homozygous) is married to an orange-faced oompa. They have 8 children. How many of those children would you expect to have a gray face?



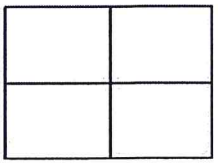
4. Otis oompa has an orange face and is married to Ona oompa who has a gray face. They have 60 children, 30 of those have orange faces. What is Ona and Otis' genotype? Show the cross.



5. Odie Oompa has a gray face, in fact everyone in Odie's family ahs a gray face, and the family likes to brag that they are a "pure"line. Much to his family's horror, he marred Ondi oompa, who *gasp* has an orange face. What will the phenotypes of their children be? What are the genotypes?

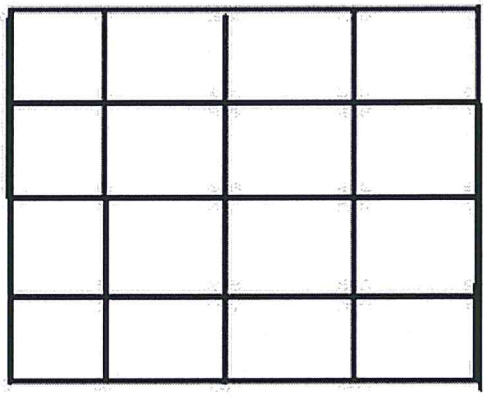


6. Ona oompa (from #4) divorces Otis and marries Otto. Otto has an orange face. What is the percentage that Ona and Otto's children will have an orange face?



Dihybrid

1. A homozygous gray faced, blue haired oompa named Ortimer marries an orange-faced (pure) red haired oompa named Odette. What will Ortimer and Odette's children look like?



2. In flying reindeer, begin able to fly (F) is dominant to not flying (f). Black noses (B) are dominant to shiny noses (b). Rudloph's father is heterozygous for both traits; his mother is homozygous recessive for both traits. What is the chance of obtaining a special reindeer like Rudolph (can fly with red nose)?