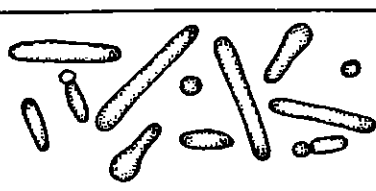



Name \_\_\_\_\_ Date \_\_\_\_\_ Class \_\_\_\_\_

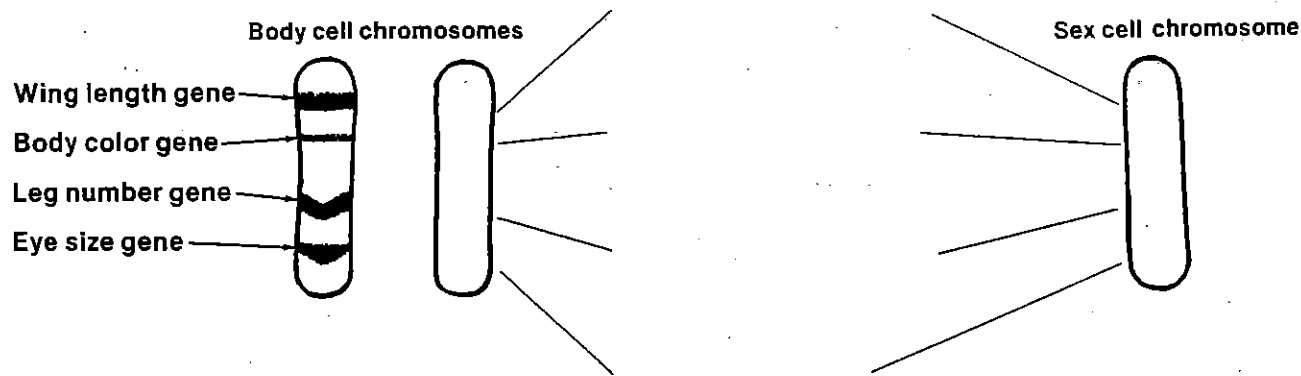
**GENETICS, HOW AND WHY**

*In Section 26:1 of your textbook, read about genes and how they are passed to offspring.*

1. Examine the drawings of horsefly chromosomes below. Complete the table by filling in the information about the chromosomes.

	Body cell	Sex cell
		
Number of chromosomes present		
Can the chromosomes be put in pairs? (yes or no)		

2. a. Genes are often shown as lines on a chromosome. Examine the diagrams below of a pair of body cell chromosomes and a sex cell chromosome of a horsefly. Complete the diagrams by drawing the genes on the unmarked chromosome and labeling them by trait.



- b. How many genes for wing length are present in this body cell? \_\_\_\_\_
  - c. How many genes for wing length are present in this sex cell? \_\_\_\_\_
3. In dogs, black fur is dominant to brown fur. Write the color each dog will be if the dog is:  
 pure dominant \_\_\_\_\_ pure recessive \_\_\_\_\_ heterozygous \_\_\_\_\_

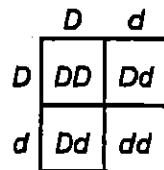
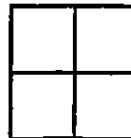
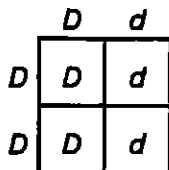
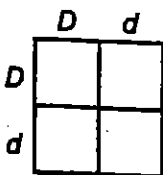
# STUDY GUIDE

Name \_\_\_\_\_ Date \_\_\_\_\_ Class \_\_\_\_\_

## EXPECTED AND OBSERVED RESULTS

In Section 26:2 of your textbook, read about solving genetics problems using the Punnett square.

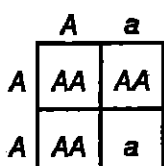
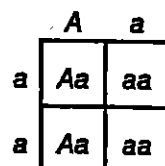
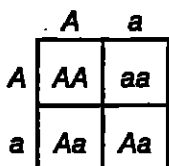
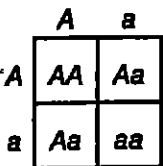
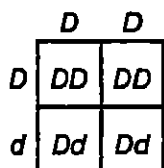
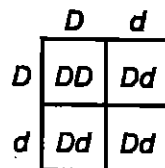
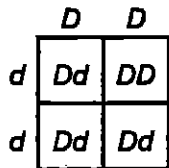
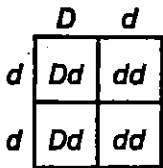
- Examine the diagrams below. Each is a step in the Punnett square method. Put the steps in order by writing the numbers 1 to 4 below them on the correct blanks.



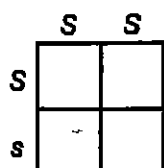
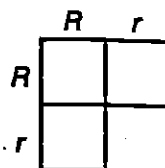
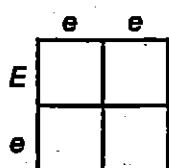
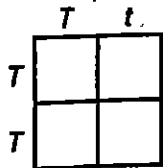
- What do the letters outside the Punnett square stand for? \_\_\_\_\_

What do the letters inside each box stand for? \_\_\_\_\_

- Examine the following Punnett squares and circle those that are correct.



- Complete the following to determine the expected offspring.



Name \_\_\_\_\_

Block \_\_\_\_\_

Date \_\_\_\_\_

Group \_\_\_\_\_

**Essay: Phenotype and Genotype** (p. 492-494)

**(NEW VOCABULARY IS IN BOLD FACED PRINT)**

1. Read the essay from beginning to end-**JUST READ IT!**
2. Complete the chart below.

	Definition	Examples
<b>Phenotype</b>		
<b>Genotype</b>		

3. Look at Figure E11.1 and read the description. Then read the second paragraph on p. 492. How did the environment in this example affect **phenotype**? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

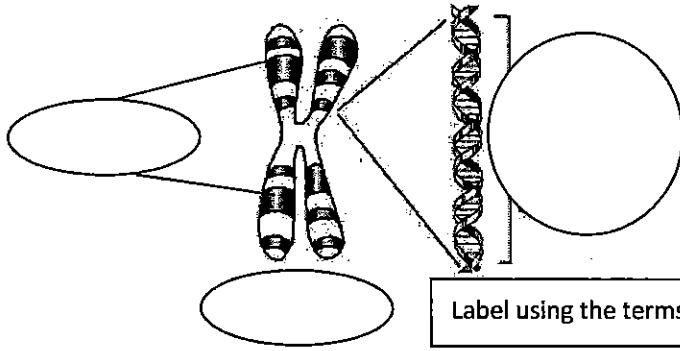
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

4. Put the following terms in the boxes in order from smallest to largest. Then write the definition under each box. (**gene, chromosome, DNA**)





Label using the terms: gene, chromosome, DNA

5. Examine Figure E11.3 and answer the following questions from the description and the essay.
- What is an **allele**? \_\_\_\_\_
  - How many **alleles** are generally inherited for each phenotype (trait)? \_\_\_\_\_
  - Why does this number make sense? \_\_\_\_\_
  - Define
    - Homozygous** \_\_\_\_\_
    - Heterozygous** \_\_\_\_\_
  - Fill in the chart based on the diagram.

Phenotypes for Human Blood		
Alleles	Blood Type	Heterozygous or Homozygous
(left side)		
(right side)		

6. Complete the chart below

Phenotype	Definition	Example	Heterozygous or Homozygous
<b>Dominant</b>			
<b>Recessive</b>			

7. What is **INDEPENDENT ASSORTMENT**? \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



Simple Genetics Practice Problems

1. For each genotype, indicate whether it is heterozygous (HE) or homozygous (HO)

AA \_\_\_\_\_  
 Bb \_\_\_\_\_  
 Cc \_\_\_\_\_  
 Dd \_\_\_\_\_

Ee \_\_\_\_\_  
 ff \_\_\_\_\_  
 GG \_\_\_\_\_  
 HH \_\_\_\_\_

li \_\_\_\_\_  
 Jj \_\_\_\_\_  
 kk \_\_\_\_\_  
 Ll \_\_\_\_\_

Mm \_\_\_\_\_  
 nn \_\_\_\_\_  
 OO \_\_\_\_\_  
 Pp \_\_\_\_\_

2. For each of the genotypes below, determine the phenotype.

*Purple flowers are dominant to white flowers*

PP \_\_\_\_\_  
 Pp \_\_\_\_\_  
 pp \_\_\_\_\_

*Brown eyes are dominant to blue eyes*

BB \_\_\_\_\_  
 Bb \_\_\_\_\_  
 bb \_\_\_\_\_

*Round seeds are dominant to wrinkled*

RR \_\_\_\_\_  
 Rr \_\_\_\_\_  
 rr \_\_\_\_\_

*Bobtails are recessive (long tails dominant)*

TT \_\_\_\_\_  
 Tt \_\_\_\_\_  
 tt \_\_\_\_\_

3. For each phenotype, list the genotypes. (Remember to use the letter of the dominant trait)

*Straight hair is dominant to curly.*

\_\_\_\_\_ straight  
 \_\_\_\_\_ straight  
 \_\_\_\_\_ curly

*Pointed heads are dominant to round heads.*

\_\_\_\_\_ pointed  
 \_\_\_\_\_ pointed  
 \_\_\_\_\_ round

4. Set up the square for each of the crosses listed below. The trait being studied is round seeds (dominant) and wrinkled seeds (recessive)

Rr x rr


What percentage of the offspring will be round?

\_\_\_\_\_

# STUDY GUIDE

Name \_\_\_\_\_ Date \_\_\_\_\_ Class \_\_\_\_\_

## EXPECTED AND OBSERVED RESULTS

In Section 26:2 of your textbook, read about the work done by Gregor Mendel in genetics.

10. Mendel made the following crosses with pea plants. Complete the Punnett squares and answer the questions about each cross.

	R	R
r		
r		

1

	R	R
R		
r		

2

	R	r
R		
r		

3

	R	r
r		
r		

4



- a. He crossed a red flowered  $R$  plant with a white flowered  $r$  plant. His results were 126 red flowered plants and 122 white flowered plants. Which of the Punnett squares above best shows the parents and offspring that could give these results? \_\_\_\_\_
- b. He crossed a red flowered plant with a white flowered plant. His results were 307 red flowered plants and 0 white flowered plants. Which of the Punnett squares above best shows the parents and offspring that could give these results? \_\_\_\_\_
- c. He crossed a red flowered plant with a red flowered plant. His results were 306 red flowered plants and 110 white flowered plants. Which of the Punnett squares above best shows the parents and offspring that could give these results? \_\_\_\_\_
- d. He crossed a red flowered plant with a red flowered plant. His results were 300 red flowered plants and 0 white flowered plants. Which of the Punnett squares above best shows the parents and offspring that could give these results? \_\_\_\_\_



Name: \_\_\_\_\_ Per: \_\_\_\_\_  
 Genetics

1. Cross a pure recessive white rabbit with a heterozygous black rabbit. Black fur (B) is dominant to white fur (b)


	Number	Genes
a) White offspring	_____	_____
b) Black offspring	_____	_____
c) heterozygous offspring	_____	_____
d) pure offspring	_____	_____

2. A black rabbit and a white rabbit mate several times. All of their offspring are black. What must the genotype of the black rabbit be? \_\_\_\_\_  
 What is the genotype of the white rabbit? \_\_\_\_\_ What genotype(s) are all of the offspring? \_\_\_\_\_

3. Cross two heterozygous black dogs. B=black b=brown


	%	Genes	Phenotype
a) black offspring	_____	_____	_____
b) brown offspring	_____	_____	_____
c) heterozygous	_____	_____	_____
d) pure dominant	_____	_____	_____

4. Kim's Mom and Dad are tall. Kim says she must have inherited a recessive gene from each parent. If she did, what is Kim's genotype if T=tall, t=short. Genotype = \_\_\_\_\_ What is her phenotype? \_\_\_\_\_

5. Explain what a farmer must do to find out if his red tomato plants are pure dominant (RR) or heterozygous (Rr)?

Name \_\_\_\_\_ Date \_\_\_\_\_ Class \_\_\_\_\_

Use after Section 27:3.

**TRACING A GENETIC DISORDER IN A FAMILY**

Genetic disorders are conditions that are inherited from parents. Sometimes parents have children who show a genetic disorder trait even though the parents themselves do not show the trait for the disorder. Persons who do not show the disorder trait but are capable of passing it to their children are called carriers. Study the family history below to find out how a child gets a genetic disorder.

Mr. and Mrs. Gearhart have a son, William, who has cystic fibrosis. Cystic fibrosis is a genetic disorder that causes large amounts of mucus to be made in the lungs and near the pancreas. This makes breathing and digestion difficult. Mr. Gearhart told a genetic counselor that he had a cousin who had cystic fibrosis. Mrs. Gearhart cannot remember anyone in her family having this disorder. Persons with cystic fibrosis are known to be pure recessive for the disorder.

Set up a Punnett square to show the gene types for each of William's parents and for William. Use *F* for the dominant gene and *f* for the recessive gene. Then, answer the questions.

Mother

Father


1. What is the gene type for Mr. Gearhart? \_\_\_\_\_ For Mrs. Gearhart?

\_\_\_\_\_ What is William's gene type? \_\_\_\_\_.

Explain your results. \_\_\_\_\_

2. The Gearhart's doctor told them that they have a chance of having another child with cystic fibrosis. Is this true? Explain. \_\_\_\_\_

3. Suppose one parent was heterozygous and the other was pure dominant for cystic fibrosis. Make a Punnett square to explain whether they would have children with cystic fibrosis or children who would be carriers of the disorder. Explain your results.


4. Would two persons who are both *FF* for cystic fibrosis ever produce children who have the disorder? \_\_\_\_\_ Will they produce children who are carriers of the disorder? \_\_\_\_\_

Explain. \_\_\_\_\_