Mendelian Genetics
Chapter 11

Starts on page 308

Roots, Prefixes & Suffixes:

homo = hetero = geno =

pheno = zyg = co = poly =

Section 11-1: Mendel & His Peas

I. Vocabulary Words:

A. Gene - a small section of a _____ (DNA) that holds the _____ for making a specific type of protein.

1. Example: _____ color gene makes the _____ that turns your eyes a certain color.

B. For each gene, there are at least _____ _____ out in the world. Some genes have _____ alleles.

1. Example: _____ color.

C. The alleles are either:

Dominant, which is written as:

OR

Recessive, which is written as:

D. Dominant alleles will _____ show up (_____) IF a person has at least _____.

1. Example: _____ hair.

E. Recessive alleles will _____ show up (_____) IF a person has _____ recessive alleles.

1. Example: _____ hair.

F. Gametes (sex cells: sperm or egg) each have only ____ copy of each _____. In other words, _____ allele per _____ in each _____.

G. We each have _____ alleles for each gene.

1. Example: you received one allele for eye color from _____ and one from ____.

H. If we get both our alleles from our parents, then we have whatever _____ of _____ and _____ they give us.

1. AA = homozygous dominant

a. We know this because:

i. homo- means _____.

and

ii. dominant is shown by a _____ letter.

2. aa = homozygous recessive

a. We know this because:

i. homo- means _____.

and

ii. recessive is shown by a _____ letter.

3. Aa = heterozygous

a. We know this because:

i. -hetero means _____.

and

ii. the genotype above contains two different alleles.

I. Genotype - the possible _____ of _____ we could get from our parents.

1. Possible combinations:

J. Phenotype - _____ characteristics that the combinations of _____ cause. Normally, you are _____ either _____ or _____ for each gene.

		Trait Survey		
Feature	Dominant Trait	Number	Recessive Trait	Number
A	Free ear lobes		Attached ear lobes	
B	Hair on fingers		No hair on fingers	
C	Widow's peak		No widow's peak	
D	Curly hair		Straight hair	
E	Cleft chin		Smooth chin	

II. Gregor Mendel's Peas

A. Vocabulary Words:

1. Cross-pollination - pollination (_____ of _____) from _____ to _____, between two _____ plants.

2. Self-pollination - pollination (_____ of _____) from _____ to _____, between flowers on the _____ plant.

B. Plants use _____ reproduction to reproduce.

1. Gregor _____ cross-pollinated plants with different _____ to see if he could figure out the _____ of how _____ were passed on.

a. Mendel was a _____ working in Europe in the _____'s. He studied _____ and _____ while working as a priest and taking care of the monastery _____.

b. Mendel's work changed biology (the study of _____) FOREVER.

C. Mendel always started with plants that were _____ - breeding = - homozygous.

1. Homozygous means:

a. Every time these plants self-pollinated, they produced _____ that were _____ to themselves.

D. What are the most important vocabulary words from this section (i.e., what words do you absolutely need to know for the test?

III. Mendel's Experiments

A. Mendel crossed _____-breeding ____ plants for one allele with true-breeding pea plants for the _____ allele.

1. Example: cross (breed) _____ -seeded pea plants X _____ -seeded pea plants

a. This is the ___ generation. This makes sense, because these two plants are the _____.

2. THEN... Mendel _____ the_____ .

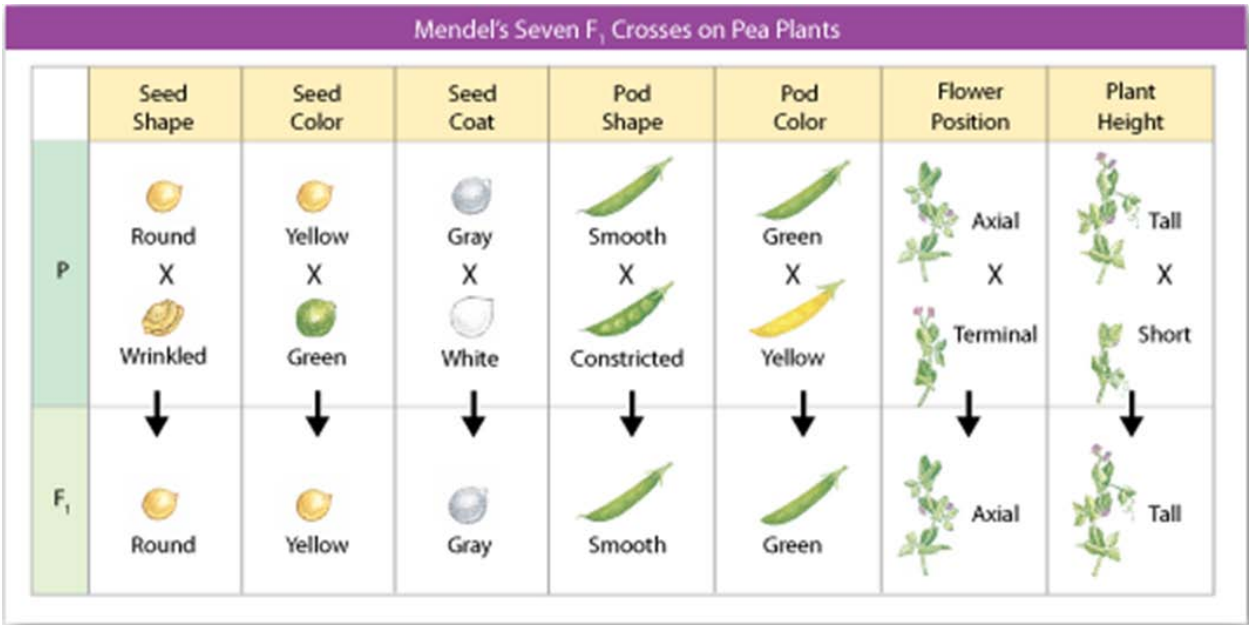
B. Mendel saw that _____ the offspring (the F1 generation) showed only _____ of the _____ possible traits/alleles for seed color. The F1 generation is the first group of _____ (children).

1. Green-seeded pea plants X yellow-seeded pea plants =

_____ % _____-seeded pea plants!

2. Mendel wasn't sure what happened to the other _____! Did it _____?

Figure 11-3 on page 310



C. To see what had really happened, Mendel crossed ____ of the F1 generation plants:

1. _____ -seeded pea plants X _____ -seeded pea plants

a. Mendel got...

i. ____ % _____ -seeded pea plants & ___ % _____ -seeded pea plants

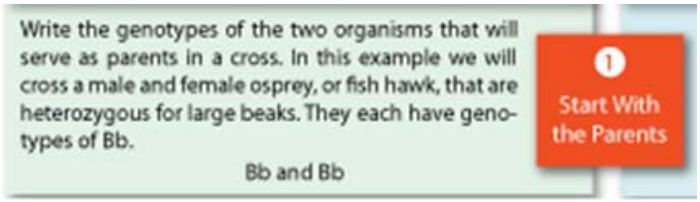
D. Did the other allele disappear?!? How do you know?

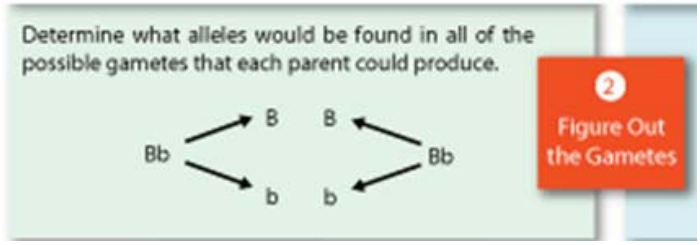
IV. Anatomy of a Punett Square

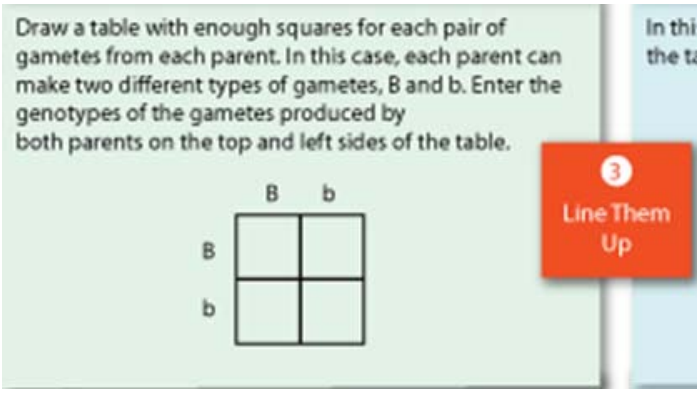
A. IF you know the _____ (the possible _____ combinations we get from our _____), THEN a _____ square can _____ the possible _____ of the _____. This is shown either as a ____ chance or as a _____.

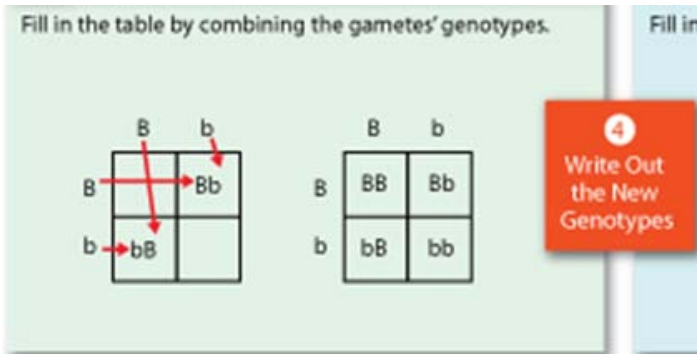
1. Example: Gene for hair color from parents. The only possible combinations are:

B. How to Make a Punnett Square: Predict Possible Gene Combos in Offspring









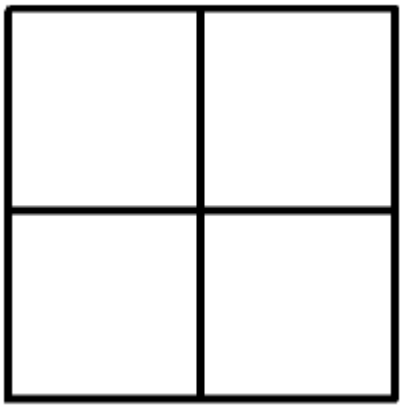
C. Punnett Square Problem #1 (USE A HIGHLIGHTER)

1. What are the possible offspring of a homozygous dominant organism crossed with a heterozygous organism?

a. Step One: Write out the cross:

_____ X _____

b. Set Up the Punnett Square:



c. Where do you see (draw arrows):

i. Parent #1?

ii. Parent #2?

iii. Possible offspring?

d. What is the genotypic ratio? _____ : _____ : _____

Homozygous Dominant | Heterozygous | Homozygous Recessive

e. What is the phenotypic ratio? _____ : _____

Dominant | Recessive

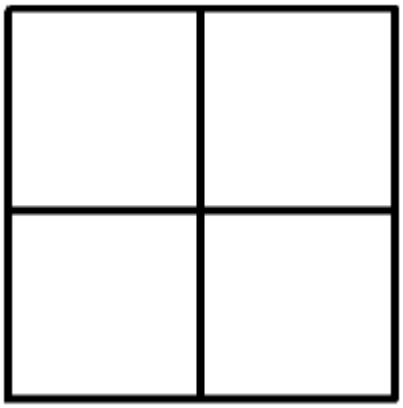
D. Punnett Square Problem #2

1. What are the possible offspring of a heterozygous organism crossed with another heterozygous organism?

a. Step One: Write out the cross:

_____ X _____

b. Set Up the Punnett Square:



c. Where do you see (draw arrows):

i. Parent #1?

ii. Parent #2?

iii. Possible offspring?

d. What is the genotypic ratio? _____ : _____ : _____

Homozygous Dominant | Heterozygous | Homozygous Recessive

e. What is the phenotypic ratio? _____ : _____

Dominant | Recessive

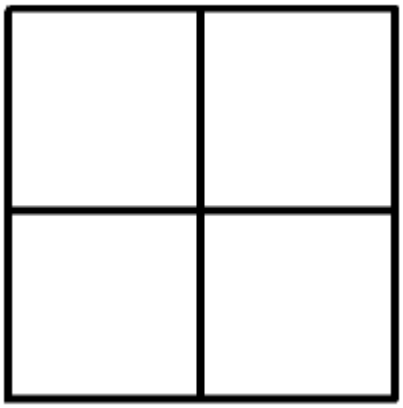
E. Punnett Square Problem #3

1. What are the possible offspring of a homozygous dominant organism crossed with a heterozygous organism?

a. Step One: Write out the cross:

_____ X _____

b. Set Up the Punnett Square:



c. Where do you see (draw arrows):

i. Parent #1?

ii. Parent #2?

iii. Possible offspring?

d. What is the genotypic ratio? _____ : _____ : _____

Homozygous Dominant | Heterozygous | Homozygous Recessive

e. What is the phenotypic ratio? _____ : _____

Dominant | Recessive

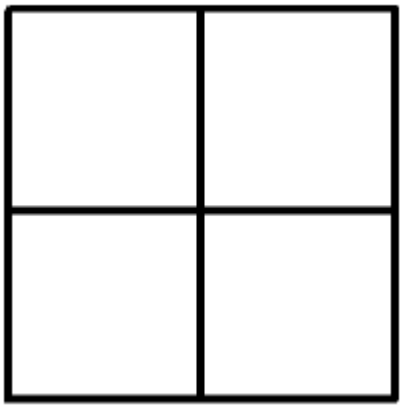
F. Punnett Square Problem #4

1. What are the possible offspring of a homozygous recessive organism crossed with a heterozygous organism?

a. Step One: Write out the cross:

_____ X _____

b. Set Up the Punnett Square:



c. Where do you see (draw arrows):

i. Parent #1?

ii. Parent #2?

iii. Possible offspring?

d. What is the genotypic ratio? _____ : _____ : _____

Homozygous Dominant | Heterozygous | Homozygous Recessive

e. What is the phenotypic ratio? _____ : _____

Dominant | Recessive

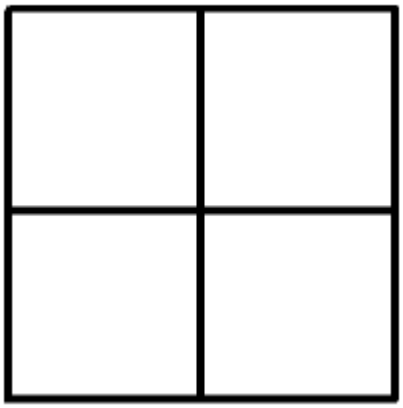
G. Punnett Square Problem #5

1. What are the possible offspring of a homozygous dominant organism crossed with another homozygous dominant organism?

a. Step One: Write out the cross:

_____ X _____

b. Set Up the Punnett Square:



c. Where do you see (draw arrows):

i. Parent #1?

ii. Parent #2?

iii. Possible offspring?

d. What is the genotypic ratio? _____ : _____ : _____

Homozygous Dominant | Heterozygous | Homozygous Recessive

e. What is the phenotypic ratio? _____ : _____

Dominant | Recessive

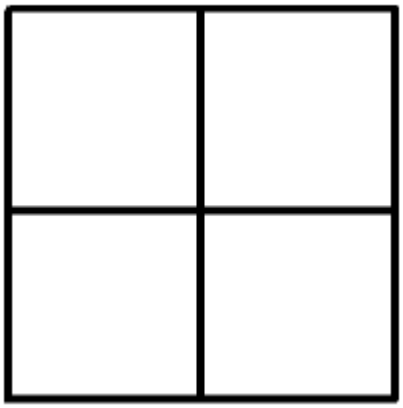
H. Punnett Square Problem #6

1. What are the possible offspring of a heterozygous organism crossed with another heterozygous organism?

a. Step One: Write out the cross:

_____ X _____

b. Set Up the Punnett Square:



c. Where do you see (draw arrows):

i. Parent #1?

ii. Parent #2?

iii. Possible offspring?

d. What is the genotypic ratio? _____ : _____ : _____

Homozygous Dominant | Heterozygous | Homozygous Recessive

e. What is the phenotypic ratio? _____ : _____

Dominant | Recessive

I. Word Problem #1(USE A HIGHLIGHTER)

A plant homozygous dominant for plant height is crossed with a plant heterozygous for the same gene. What is the percent chance of getting a short plant?

V. Problems with Specific Genes & Alleles

A. Problem #1

A plant that is homozygous dominant for plant height is crossed with a plant that is heterozygous for plant height.

What is the percent chance of getting a short plant?

1. Step One: Define Genes & Alleles

Gene =

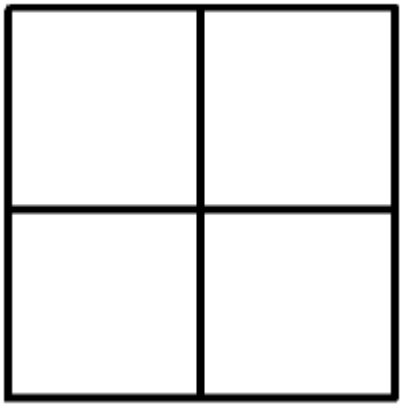
Alleles = =

= =

2. Step Two: Write Out the Cross

_____ X _____

3. Step Three: Make Your Punnett Square



4. Step Four: Figure Out the Ratios

Genotypic ratio? _____ : _____ : _____

Homozygous Dominant | Heterozygous | Homozygous Recessive

Phenotypic ratio? _____ : _____

Dominant | Recessive

5. Step Five: Go back and answer any specific questions:

B. Problem #2

A short pea plant is crossed with a plant heterozygous for the same gene.

What is the percent chance of getting a short plant?

1. Step One: Define Genes & Alleles

Gene =

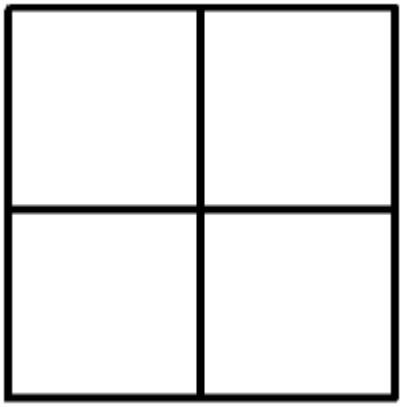
Alleles = =

= =

2. Step Two: Write Out the Cross

_____ X _____

3. Step Three: Make Your Punnett Square



4. Step Four: Figure Out the Ratios

Genotypic ratio? _____ : _____ : _____

Homozygous Dominant | Heterozygous | Homozygous Recessive

Phenotypic ratio? _____ : _____

Dominant | Recessive

5. Step Five: Go back and answer any specific questions:

C. Problem #3

A plant with wrinkled seeds is crossed with a plant with round seeds.

What will the offspring be like?

1. Step One: Define Genes & Alleles

Gene =

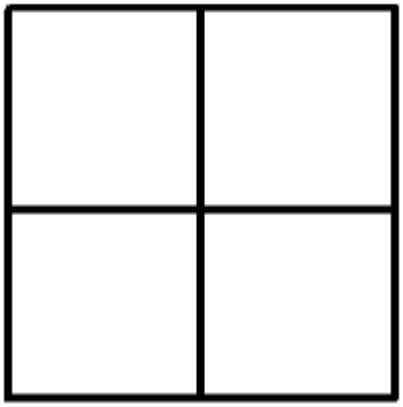
Alleles = =

= =

2. Step Two: Write Out the Cross

_____ X _____

3. Step Three: Make Your Punnett Square



4. Step Four: Figure Out the Ratios

Genotypic ratio? _____ : _____ : _____

Homozygous Dominant | Heterozygous | Homozygous Recessive

Phenotypic ratio? _____ : _____

Dominant | Recessive

5. Step Five: Go back and answer any specific questions:

Section 11-3: Alternatives to Dominant & Recessive Alleles

I. So Far: Dominant _____ wins. When dominant and recessive alleles are together, you only see _____.

II. But Now: We will learn about other possibilities.

A. _____Dominance - heterozygotes that look like an _____ of the _____ possible alleles.

1. Example: Homozygous white flower X homozygous red flower: Online Example

= HETEROZYGOUS _____ FLOWERS!

B. Codominance - heterozygote shows _____ alleles at the same _____. Online Example

1. Example: White chicken X black chicken

= _____ CHICKEN!

a. Speckled - both _____ and _____ feathers at the same time.

C. _____ Alleles - one gene with _____ than two alleles in the _____. Online Example

1. Examples: Eye color, rabbit coat color, _____ type

D. Polygenic Traits - one _____ is controlled by _____ genes. Online Example

1. Examples: Skin color, height, eye color

E. _____ Type

1. Blood type is an example of _____ alleles and _____.

2. There are _____ blood types in humans:

O A B AB

3. Blood cells have _____ on their surface so that your _____ system can _____ them.

4. Pictures of the four different types of blood cells:

Type A

Type B

Type AB

Type O

5. You can only receive blood that has _____ that you _____ have, or your blood will coagulate (_____) because your _____ system will _____ the _____.

6. Type O = universal donor

a. _____ can receive Type O blood.

i. WHY?

7. Type AB = universal acceptor

a. People with Type AB blood can _____ blood from anyone.

i. WHY?

8. Example: A mother with Type AB blood is crossed with a father with Type O blood.

a. Is it possible for their offspring to have Type O blood?

A =

=

B =

=