

Name: _____ Date: _____ Period: _____

Genetics Problems

Remember, in abbreviating genotypes, you should use a capital letter for the dominant allele and the SAME letter in lower case for the recessive allele. Usually you should pick the first initial of the dominant trait.

1. In watermelons, plain fruit is dominant over striped fruit.
 - a. What's the genotype for a homozygous dominant watermelon? _____.
 - b. For a homozygous recessive watermelon? _____.
 - c. For a heterozygous watermelon? _____.
2. In guinea pigs, white fur is recessive and black is dominant.
 - a. What's the heterozygous genotype? _____.
 - b. What's the corresponding phenotype? _____.

3. In Siberian tigers, orange fur is dominant over white. Fill out the table below:

<u>Genotype</u>	<u>Genotype Symbolized</u>	<u>Phenotype</u>
Homozygous Dominant	_____	_____
Heterozygous	_____	_____
Homozygous Recessive	_____	_____

4. Springfield USA is home to the Simpsons and all their pals. Springfieldians come in two varieties, those with four fingers on each hand (dominant) and those with five (recessive). Bart has four fingers. What are his possible genotypes? _____. If Krusty the Clown and Aunt Selma are both heterozygous for this trait, and they marry and mate, would it be possible for them to have five-fingered children? Explain.

Chief Wiggum has 4 fingers. Is it possible that his mother had 5 fingers? Explain.

5. In dogs, short fur (S) is dominant over long fur (s). In the Punnett square below, show the probable offspring of a cross between a heterozygous male dog and a homozygous recessive female.

_____	X	_____
Father's Genotype		Mother's Genotype

Genotypic Ratio: _____
(SS : Ss : ss)

Phenotypic Ratio: _____
(short : long)

6. In silkworms, yellow cocoons are dominant over white cocoons. Draw a Punnett square for a cross between a heterozygous male and a homozygous dominant female.

Genotypic Ratio: _____

Phenotypic Ratio: _____

7. In our human traits lab, free earlobes (F) were dominant over attached earlobes (f). Make a Punnett square to predict the outcomes between you and your partner:

Genotypic Ratio: _____

Phenotypic Ratio: _____

8. Do the offspring you produced in our making babies lab represent the probabilities given in this Punnett square? _____ Why?

9. THINK! In peas, smooth seeds are dominant over wrinkled seeds and green pods are dominant over yellow pods. Draw a SINGLE big Punnett square that shows a cross between two pea plants that are heterozygous for BOTH of these traits. This is known as a **dihybrid cross**. (Go back and carefully read Mendel's entire Principle of Segregation. Figure out all the possible gametes that each parent could produce. Do this in pencil and keep an eraser handy!)

To start you off, the parents genotypes are both written as SsGg.

What gametes can you make?

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Female gametes

Male gametes

Each offspring will have BOTH a seed texture AND a pod color. Thus each will be one of four different **phenotypes**. What are they?

In your cross, what's the phenotypic ratio? (4 numbers...)

Dihybrid crosses in Bikini Bottom:

In Bikini Bottom,

Squarepants (S) is dominant to roundpants (s)

Long nose (L) is dominant to stubby nose (l)

SpongeBob’s aunt, who is a roundpants, has a cute stubby nose. She has finally found the sponge of her dreams and is ready to settle down. Her fiancé always comments on how adorable her nose is (he says it reminds him of his mother’s – aww, how sweet!). They wonder what the chances are of that trait being passed on. Her fiancé is heterozygous for both squarepants and heterozygous for his long nose.

A. Identify the genotypes of the aunt and her fiancé.

Aunt = _____ Fiancé = _____

B. What are the possible gamete combinations for each person?

Aunt’s gametes:

Fiancé’s gametes:

C. Complete the Punnett Square below:

D. What are the phenotypic ratios that result?

(____ Square, long : ____ square, stubby : ____ round, long : ____ round, stubby)