Bikini Bottom Genetics Name _____

Scientists at Bikini Bottoms have been investigating the genetic makeup of the organisms in this community. Use the information provided and your knowledge of genetics to answer each question.

1. For each genotype below, indicate whether it is a heterozygous (He) OR homozygous (Ho).

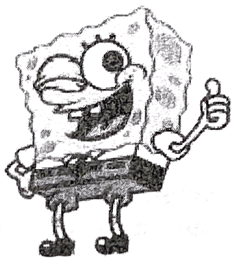
TT _____ Bb _____ DD _____ Ff _____ tt _____ dd _____

Dd _____ ff _____ Tt _____ bb _____ BB _____ FF _____

Which of the genotypes in #1 would be considered purebred? _____

Which of the genotypes in #1 would be hybrids? _____

2. Determine the phenotype for each genotype using the information provided about SpongeBob.



Yellow body color is dominant to blue.

YY _____ Yy _____ yy _____

Square shape is dominant to round.

SS _____ Ss _____ ss _____

3. For each phenotype, give the genotypes that are possible for Patrick.

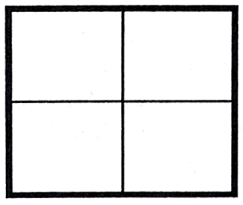
A tall head (T) is dominant to short (t).

Tall = _____ Short = _____

Pink body color (P) is dominant to yellow (p).

Pink body = _____ Yellow body = _____

4. SpongeBob SquarePants recently met SpongeSusie Roundpants at a dance. SpongeBob is heterozygous for his square shape, but SpongeSusie is round. Create a Punnett square to show the possibilities that would result if SpongeBob and SpongeSusie had children. HINT: Read question #2!

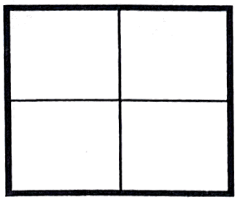


A. List the possible genotypes and phenotypes for their children.

B. What are the chances of a child with a square shape? ____ out of ____ or ____%

C. What are the chances of a child with a round shape? ____ out of ____ or ____%

5. Patrick met Patti at the dance. Both of them are heterozygous for their pink body color, which is dominant over a yellow body color. Create a Punnett square to show the possibilities that would result if Patrick and Patti had children. HINT: Read question #3!

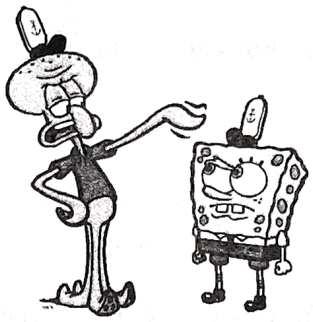


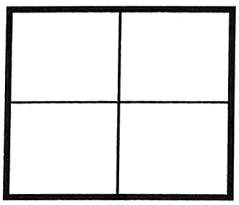
A. List the possible genotypes and phenotypes for their children.

B. What are the chances of a child with a pink body? ____ out of ____ or ____%

C. What are the chances of a child with a yellow body? ____ out of ____ or ____%

6. Everyone in Squidward's family has light blue skin, which is the dominant trait for body color in his hometown of Squid Valley. His family brags that they are a "purebred" line. He recently married a nice girl who has light green skin, which is a recessive trait. Create a Punnett square to show the possibilities that would result if Squidward and his new bride had children. Use B to represent the dominant gene and b to represent the recessive gene.





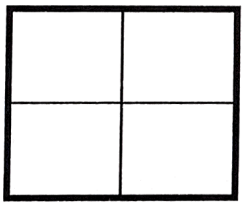
A. List the possible genotypes and phenotypes for their children.

B. What are the chances of a child with light blue skin? ____%

C. What are the chances of a child with light green skin? ____%

D. Would Squidward's children still be considered purebreds? Explain!

7. Assume that one of Squidward's sons, who is heterozygous for the light blue body color, married a girl that was also heterozygous. Create a Punnett square to show the possibilities that would result if they had children.

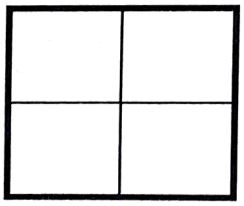


A. List the possible genotypes and phenotypes for their children.

B. What are the chances of a child with light blue skin? ____%

C. What are the chances of a child with light green skin? ____%

8. Mr. Krabbs and his wife recently had a Lil' Krabby, but it has not been a happy occasion for them. Mrs. Krabbs has been upset since she first saw her new baby who had short eyeballs. She claims that the hospital goofed and mixed up her baby with someone else's baby. Mr. Krabbs is homozygous for his tall eyeballs, while his wife is heterozygous for her tall eyeballs. Some members of her family have short eyes, which is the recessive trait. Create a Punnett square using T for the dominant gene and t for the recessive one.



A. List the possible genotypes and phenotypes for their children.

B. Did the hospital make a mistake? Explain your answer.

Name _____ Date _____ Period _____

Genetics Problems – Worksheet #1

1) If short hair (L) is dominant to long hair (l), animals with LL and Ll have the same

a. parents b. genotypes c. phenotypes d. alleles e. genes

2) If all offspring of a cross have the genotype Aa, the parents of the crosses would most likely be:

a. AA x aa b. As x Aa c. Aa x aa d. AA x Aa e. none of these

3) If tall (D) is dominant to dwarf (d) and two homozygous varieties DD and dd are crossed, then what kind of offspring will be produced?

a. all intermediate forms b. all tall c. all dwarf d. ½ tall, ½ dwarf e. ¾ tall, ¼ dwarf

4) For each genotype below, indicate whether it is heterozygous or homozygous

AA _____ Bb _____ Pp _____

5) For each genotype, determine what phenotype would be possible.
Brown eyes are dominant to blue eyes

BB _____ Bb _____ bb _____

Round seeds are dominant to wrinkled seeds

RR _____ Rr _____ rr _____

6) A TT (tall) plant is crossed with a tt (short). What percentage of the offspring will be tall? _____

7) The allele N codes for a normal nose and the allele n codes for a green nose. If two individuals who are both heterozygous at this gene location mate with each other, what combinations of alleles will their offspring have (genotypic ratio)? What will their noses look like (phenotypic ratio)?

8) In pea plants, the allele for tall plants (T) is dominant to the allele for short plants (t). You observe that the offspring of a cross include 78 tall plants and 27 short plants. 1) What was the probable allele combination of the two parent plants? 2) How would your answer change if the offspring included 121 tall plants and 118 short plants?

9) In tomatoes red fruit color is dominant to yellow. Suppose a tomato plant homozygous for red is crossed with one homozygous for yellow. Determine the appearance of the F_1 Generation.

10) A red-fruited tomato plant (which is dominant), when crossed with a yellow-fruited one, produces progeny about half of which are red-fruited and half which are yellow fruited. What are the genotypes of the parents?

11) Purple flowers are dominant to white flowers in the Jimsonweed plant. When a particular purple-flowered Jimsonweed is self-pollinated, there are 28 purple-flowered and 10 white-flowered plants in the F_1 Generation. What are the genotypes of the parents? What is the phenotypic and genotypic ratio of the F_1 Generation?

12) In dogs, wire hair (H) is dominant to smooth hair (h). In a cross of a homozygous wire-haired dog with a smooth-haired dog, what will be the phenotypic ratio of the F_1 Generation?

13) Incomplete dominance is seen in snapdragons. The allele that causes red flowers (F) is not completely dominant over the allele that causes white flowers (f). When a plant is heterozygous for the trait of flower color (Ff), pink flowers result. Cross two pink snapdragons, and provide the genotypic and phenotypic of all the offspring.

14) Two black guinea pigs were mated and produced 29 black and 9 white offspring. What were the genotypes of the parent guinea pigs? What are the expected phenotypic and genotypic ratios of the offspring?

15) The ability to roll up the tongue into a U-Shape is a dominant trait. Suppose a women who can roll her tongue has children with a man who cannot roll his tongue. Their first child cannot roll his tongue. What does this tell us about the genotype of the woman?