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 _____

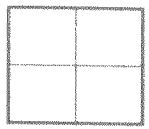
Square shape is dominant to round.
SS _____ Ss _____ ss _____

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!

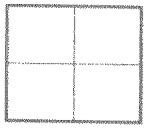


A. List the possible genotypes and phenotypes for their children.

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.

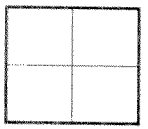
7. Assume that one of Squidward's sons, who is heterozygous for the light blue body color, married a girl that was also heterozygous. Create a Punnett square to show the possibilities that would result if they had children.

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.

Monohybrid Crosses

OOMPA LOOMPA GENETICS

Name _____

SHOW WORK HERE!

_____ = gray face

_____ = gray face

_____ = orange face

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 OOmpah's face colors

2. Two heterozygous OOmpahs are crossed. What proportion of the offspring will have orange faces? _____

3. A gray faced OOmpah (homozygous) is married to an orange faced Oompah. They have 8 Oompah children.
How many of those children will have gray faces? _____

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

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

What are the genotypes of the children? _____

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

Monohybrid Crosses

Incomplete Dominance

7. OOmpahs can have red, blue, or purple hair. The allele that controls this trait is INCOMPLETELY DOMINANT, where purple hair is caused by the heterozygous condition. Show a "key" for the genotypes and phenotypes of hair color

_____ = blue

_____ = red

_____ = purple

8. Orville Oompah has purple hair and is married to Opal Oompah who brags that she has the bluest blue hair in the valley. How many of Opal's children will be able to brag about their blue hair also _____
How many will take after their father? _____

Incomplete Dominance

9. One of Opal's children is born with shocking red hair. Is Orville Oompah the father of this child? _____
But wait, Opal swears that she has been faithful, she claims the hospital goofed and got her baby mixed with someone else's. Is Opal the mother of the red haired child? _____

10. Olga Oompah has red hair and marries Oliver Oompah who has blue hair. They have 32 children. What is the color of these children's hair? _____

11. Olivia Oompah is married to Odo Oompah. Both of them have purple hair. They have 100 children. What is the hair color of their children and in what proportion?
Red _____ Blue _____ Purple _____

12. In the land of OOmpah, blue hair is highly valued. Blue haired OOmpahs get special benefits. Oscar Oompah has purple hair but he wants a wife that will give him children with blue hair.
What color hair should he look for in a wife? _____
If he can't find this type of Oompah what should be his second choice? _____

13. Ophelia Oompah is not married but she wants to have children. She goes to a fertility clinic where she is fertilized by an anonymous sperm donor. Ophelia has red hair. 5 months later, a litter of oompahs is born, of the eight babies in the litter, 4 of them have red hair, and 4 of them have purple hair. What color hair did the babies' father have? _____ (Show the cross)

14. Ophelia repeats the process a year later. This time she has a litter of 5 oompahs, all of which have purple hair. What was the father's hair color in this case? _____
(Show the cross)

Dihybrid Crosses

15. A homozygous gray faced, blue haired oompah named Ortimer marries an orange faced (homozygous) red haired oompah named Odette. GGBB x ggRR What will Ortimer and Odette's children look like? _____

16. Two oompahs, both heterozygous for both traits are married. Out of 16 children, how many of each type would you expect?