

SPONGEBOB GENETICS (PAGE 1)

Geneticists at Bikini Bottom have been studying the genetic makeup of the organisms in the community. Use your knowledge of genetics and Punnett squares 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 considered hybrids? _____

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



Yellow body color is dominant to blue.

a. YY _____ b. Yy _____ c. yy _____

Square shape is dominant to round.

d. SS _____ e. Ss _____ f. ss _____

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

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

a. Tall: _____ b. Short: _____

A pink body (P) is dominant to yellow (p).

a. Pink: _____ b. Yellow: _____



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

♀	♂		

- a. Give the genotypes and phenotypes for the offspring.

b. What are the chances of a square-shaped child? _____ %

c. What are the chances of a round-shaped child? _____ %

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. Give the genotypes and phenotypes for the offspring.

b. What are the chances of a pink bodied child? _____ %

c. What are the chances of a yellow bodied child? _____ %

6. Everyone in Squidward's family has light blue skin, which is the dominant trait for body color. His family brags that they are a "purebred" line. He recently married a nice girl who has light green skin, which is the 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.



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- a. Give the genotypes and phenotypes for the offspring.

- b. What are the chances of a light blue child? _____%
- c. What are the chances of a light green child? _____%
- d. Would Squidward's children still be considered purebred? Explain.

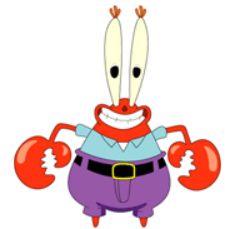
7. Assume that one of Squidward's sons, who is heterozygous for the light blue body color, married a girl that was also heterozygous. Create a Punnett square to show the possibilities that would result if they had children.

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- a. Give the genotypes and phenotypes for the offspring.

- b. What are the chances of a light blue child? _____%
- c. What are the chances of a green bodied child? _____%

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.



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- a. Give the genotypes and phenotypes for the offspring.

- b. Did the hospital make a mistake? Explain.

SPONGEBOB GENETICS (PAGE 2)

Geneticists at Bikini Bottom have been studying the genetic makeup of the organisms in the community. Use your knowledge of genetics and Punnett squares to answer each question.

1. Use the information for SpongeBob's traits to write the phenotype (physical appearance) for each item.

Trait	Dominant Gene	Recessive Gene
Body Shape	squarepants (S)	roundpants (s)
Body Color	yellow (Y)	blue (y)
Eye Shape	round (R)	oval (r)
Nose Style	long (L)	stubby (l)

- | | |
|--------------|--------------|
| a. LL: _____ | e. Rr: _____ |
| b. yy: _____ | f. ll: _____ |
| c. Ss: _____ | g. ss: _____ |
| d. RR: _____ | h. Yy: _____ |

2. Use the information in the chart above to write the genotype (or genotypes) for each trait below.



- | | |
|-----------------------|-----------------------|
| a. yellow body: _____ | e. stubby nose: _____ |
| b. roundpants: _____ | f. round eyes: _____ |
| c. oval eyes: _____ | g. squarepants: _____ |
| d. long nose: _____ | h. blue body: _____ |

3. Determine the genotypes for each using the information in the chart above.

- | | |
|-----------------------------------|------------------------------------|
| a. heterozygous round eyes: _____ | c. homozygous long nose: _____ |
| b. homozygous squarepants: _____ | d. heterozygous yellow body: _____ |

4. One of SpongeBob's cousins, SpongeBillyBob, recently met a cute squarepants gal, SpongeGerdy, at a local dance and fell in love. Use your knowledge of genetics to answer the questions below.

- a. If SpongeGerdy's father is a heterozygous squarepants and her mother is a roundpants, what is her genotype? Complete the Punnett square to show the possible genotypes that would result to help you determine Gerdy's genotype.

What is Gerdy's genotype? _____

♀	♂		

- b. SpongeBillyBob is heterozygous for his squarepants shape. What is his genotype? _____
- c. Complete the Punnett square to show the possibilities that would result if Billy Bob & Gerdy had children.

♀	♂		

- a. Give the genotypes and phenotypes for the offspring.

- b. What is the probability of kids with squarepants? _____ %
- c. What is the probability of kids with roundpants? _____ %

5. SpongeBob's aunt and uncle, SpongeWilma and SpongeWilbur, have the biggest round eyes in the family. Wilma is believed to be heterozygous for her round eye shape, while Wilbur's family brags that they are purebred. Complete the Punnett square to show the possibilities that would result if SpongeWilma and SpongeWilbur had children.

a. List the genotypes for each: Wilma: _____ Wilbur: _____

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b. Complete the Punnett square to show the possibilities that would result if they had children.

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

d. What are the chances of their kids having round eyes? _____ %

What are the chances of a child with an oval eyes? _____ %

6. SpongeBob's mother is so proud of her son and his new wife, SpongeSusie, as they are expecting a little sponge. She knows that they have a 50% chance of having a little roundpants, but is also hoping the new arrival will be blue (a recessive trait) like SpongeSusie. If SpongeBob is heterozygous for his yellow body color, what are the chances that the baby sponge will be blue? Create a Punnett square to help you answer this question.

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7. SpongeBob's aunt is famous around town for her tiny stubby nose! She recently met a cute squarepants fellow who also has a stubby nose, which is a recessive trait. Would it be possible for them to have a child with a regular long nose? Why or why not? Create a Punnett square to help you answer this question.

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8. If SpongeBob's aunt described in #7 wanted children with long noses, what type of fellow would she need to marry in order to give her the best chances? Create a Punnett square to help you answer this question.

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SPONGEBOB GENETICS (PAGE 3) – INCOMPLETE DOMINANCE

SpongeBob loves growing flowers for his pal Sandy! Her favorite flowers, Poofkins, are found in red, blue, and purple varieties. Use the information provided and your knowledge of incomplete dominance to complete each section below.



1. Write the correct genotype if R represents a red color gene and B represents blue.

Red: _____

Blue: _____

Purple: _____

2. What would happen if SpongeBob crossed a Poofkin with red flowers with a Poofkin with blue flowers? Complete the Punnett square to determine the chances of each flower color.

♀	♂		

- a. Give the genotypes and phenotypes for the offspring.

- b. How many of the plants would have red flowers? _____ %
 c. How many of the plants would have purple flowers? _____ %
 d. How many of the plants would have blue flowers? _____ %

3. What would happen if SpongeBob crossed two Poofkins with purple flowers? Complete the Punnett square to show the probability for each flower color.

♀	♂		

- a. Give the genotypes and phenotypes for the offspring.

- b. How many of the plants would have red flowers? _____ %
 c. How many of the plants would have purple flowers? _____ %
 d. How many of the plants would have blue flowers? _____ %

4. What would happen if SpongeBob crossed a Poofkin with purple flowers with a Poofkin with blue flowers? Complete the Punnett square to show the probability for plants with each flower color.

♀	♂		

- a. Give the genotypes and phenotypes for the offspring.

- b. If SpongeBob planted 100 seeds from this cross, how many should he expect to have of each color?

Purple: _____ Blue flowers: _____ Red flowers: _____

SpongeBob and his pal Patrick love to go jellyfishing at Jellyfish Fields! The fields are home to a special type of green jellyfish known as Goobers and only really great jellyfishermen are lucky enough to catch some. Many of the jellyfish are yellow (YY) or blue (BB), but some end up green as a result of incomplete dominance. With this information, answer the questions below.



5. What would happen if SpongeBob and Patrick crossed two "goobers" or green jellyfish? Complete the Punnett square to help you determine the probability for each color of jellyfish.

♀	♂		

- a. Give the genotypes and phenotypes for the offspring.

- b. What percentage of the jellyfish will be yellow? _____%
- c. What percentage of the jellyfish will be blue? _____%
- d. What percentage of the jellyfish will be goobers? _____%

6. What would happen if they crossed a yellow jellyfish with a goober? Complete the Punnett square to help you determine the probability for each color of jellyfish.

♀	♂		

- a. Give the genotypes and phenotypes for the offspring.

- a. What percentage of the jellyfish will be yellow? _____%
- b. What percentage of the jellyfish will be blue? _____%
- c. What percentage of the jellyfish will be goobers? _____%

7. What would happen if they crossed a blue jellyfish with a yellow jellyfish? Complete the Punnett square to help you answer the questions.

♀	♂		

- a. Give the genotypes and phenotypes for the offspring.

- b. If 100 jellyfish were produced from this cross, how many would you expect from each?
Yellow: _____ Blue: _____ Goobers: _____

8. What would happen if they crossed a blue jellyfish with a goober? Complete the Punnett square to help you answer the questions.

♀	♂		

- a. Give the genotypes and phenotypes for the offspring.

- b. If 100 jellyfish were produced from this cross, how many would you expect from each?
Yellow: _____ Blue: _____ Goobers: _____