

## BIKINI BOTTOM GENETICS #1

Part 1: Scientists at Bikini Bottoms have been investigating the genetic makeup of SpongeBob & his pals. 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). ← Same → 2 caps or 2 lower case

TT Ho Bb He DD Ho Ff He tt Ho dd Ho

↑ Different  
1 cap and 1  
lower case

→ Circle the genotypes in #1 that would be considered purebreds.

**Purebred = Two of the same  
genes – both dominant or  
both recessive**

**Hybrid = One of each – one  
dominant and one recessive**

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

Yellow body color is dominant to blue.

**Y = Yellow    y = Blue**

YY **Yellow**    Yy **Yellow**    yy **Blue**

Square shape is dominant to round.

**S = Square    s = Round**

SS **Square**    Ss **Square**    ss **Round**

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

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

Tall = TT or Tt

Short = tt

**Must have two recessive genes to see this trait**



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

Pink = PP or Pp

Yellow = pp

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!

#4.

	<u>S</u>	<u>s</u>
<u>s</u>	Ss	ss
<u>s</u>	Ss	ss

A. What are the parent's genotypes? Ss x ss

B. Complete the Punnett square.

C. What are the chances of a child with a square shape?  
**2 of the 4 have at least one dominant gene → 50%**

D. What are the chances of a child with a round shape?  
**2 of the 4 have two recessive genes → 50%**

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!

#5.

	<u>P</u>	<u>p</u>
<u>P</u>	PP	Pp
<u>p</u>	Pp	pp

A. What are the parent's genotypes? Pp x Pp

B. Complete the Punnett square.

C. What are the chances of a child with a pink body?  
**3 of the 4 have at least one dominant gene → 75%**

D. What are the chances of a child with a yellow body?  
**1 of the 4 has both recessive genes → 25%**

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.

#6.

	<u>B</u>	<u>B</u>
<u>b</u>	Bb	Bb
<u>b</u>	Bb	Bb

A. What are the parent's genotypes? BB x bb

B. Complete the Punnett square.

C. What are the chances of a child with a blue body?  
**All have one dominant gene → 100%**

D. What are the chances of a child with a green body?  
**None have two recessive genes → 0%**

E. Would the children be considered purebreds? Explain!

**No, each child would have one dominant gene and one recessive making them hybrids.**

**Assignment:**

**BIKINI BOTTOM GENETICS #2 - Do the BACK for class tomorrow!**

**Bikini Bottom Genetics #2**

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

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) Yellow body - **YY or Yy**

(b) Oval eyes - **rr**

(c) Squarepants - **SS or Ss**

(d) Purebred squarepants - **SS**

(e) Hybrid yellow body - **Yy**

2. Use the information in the chart in #1 to tell the phenotype for each genotype below.

(a) YY = **Yellow** (b) ss = **Roundpants** (c) Rr = **Round eyes**

3. SpongeBob's mother is so proud of her son and his new wife, SpongeSusie, as they are expecting a little sponge. SpongeBob is heterozygous for his yellow body color, while SpongeSusie is blue (the recessive trait).



A. What would SpongeBob's genotype be? **Ss** SpongeSusie? **ss**

B. Use the Punnett square to determine the offspring.

C. What are the chances the baby sponge will be blue? Explain!

	S	s
s	Ss	ss
s	Ss	ss

**There is a 50% chance for blue since two of the 4 genotypes have both recessive genes.**

4. Mr. Krabbs and his wife recently had a Lil' Krabby (in real life - not the TV show), 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.

A. Mr. Krabbs is homozygous for his tall eyeballs, while his wife is heterozygous for her tall eyeballs. If T is used for the dominant gene and t for the recessive gene, what would the genotypes be for each one?

Mr. Krabbs = **TT** Mrs. Krabbs = **Tt**

B. Use the Punnett square to determine the offspring.

C. What are the chances Lil' Krabby would have tall eyeballs? **100** %

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

**Yes → Based on the genotypes provided, none of the offspring have both recessive genes.**

**No**

**→ Mr. Krabbs may not be TT if any members of his family have short eyeballs. If he was Tt, there would be a 25% chance to short eyeballs**

**→ Mr. Krabbs is not the father. Another crab with Tt or tt would result in 25-50% chance of short eyeballs.**

**→ The height of the eyeballs may be an age-related trait and doesn't show up at birth.**

**→ Short eyeballs may be due to a genetic disorder/defect.**



	T	T
T	TT	TT
t	Tt	Tt