

Bikini Bottom – Dihybrid Crosses

Name _____

Use the chart to identify the genotypes of the following traits:

1. Heterozygous round eyes, blue body Rr yy
2. Hybrid eye shape, purebred roundpants Rr ss
3. Purebred roundpants, heterozygous long nose ss Ll

| 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) |

4. 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 a purebred squarepants and is a hybrid for his long nose.

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

Aunt = Roundpants, Stubby Nose = ssll Fiancé = Purebred Squarepants, Long Nose = SSLL

* Gametes have 1/2 the genetic info so ONE allele (letter) for EACH trait

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

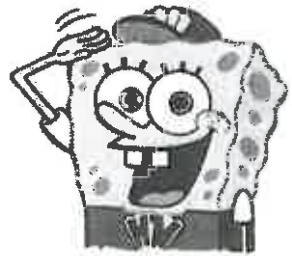
Aunt = sl Fiancé = SL, Sl

C. What are the possible genotypes for their children? SsLl Ssll

5. As we know, SpongeBob is heterozygous for his yellow body color and his squarepants, while his wife SpongeSusie is blue and has roundpants. Use this information to answer the following questions.

A. Give the genotypes for each.

SpongeBob = YySs SpongeSusie = yyss

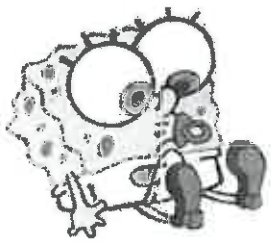


B. What are the possible gamete combinations for each person?

Foil SpongeBob = YS, Ys, yS, ys SpongeSusie = ys

C. Complete the Punnett square based on the information provided in #5.

| | | | | |
|-----------|-------------|-------------|-------------|-------------|
| | <u>YS</u> | <u>Ys</u> | <u>yS</u> | <u>ys</u> |
| <u>ys</u> | <u>YySs</u> | <u>Yyss</u> | <u>yySs</u> | <u>yyss</u> |
| | | | | |
| | | | | |



D. Answer the questions based on your Punnett square.

What is the chance of a blue baby? 50%

What is the chance of a blue squarepants? 25%

What is the chance of a squarepants? 50%

What is the chance of a purebred recessive for both traits? 25%

6. In starfish, pink body color (P) is dominant to orange (p), and thick eyebrows (T) are dominant over thin (t) ones. Patrick, who is heterozygous for body color but purebred for thick eyebrows, has met Patti, who is recessive for both traits.

P=pink p=orange
T=thick t=thin



A. What is Patti's phenotype? pptt

B. Is it possible for the new couple to have offspring that resemble their mother? Explain.

Patrick = PpTt

No because Patrick does not carry the recessive trait for thin eyebrows

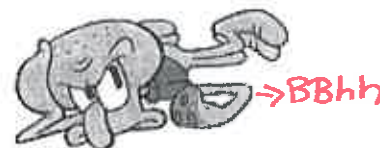
C. Before Patrick commits to this relationship, he would like to guarantee that his offspring would have his thick eyebrows as he thinks they make him smarter! You need to provide evidence for or against the marriage with regards to eyebrows ONLY.

Yes guaranteed.

Proof → Patrick → Tt
Patti → tt

| | | |
|---|----|----|
| | T | t |
| t | Tt | tt |
| t | Tt | tt |

7. While Squidward's family boasts about being a purebred line for dominant light blue skin color, they are also purebred for a less distinguished trait: the recessive trait of baldness. Lack of hair causes Squidward some self-esteem issues that he does not want his children to face. He would like to ensure that his offspring have hair AND with his blue skin color. What traits should he look for in a bride?



Squidward Traits:

Skin Color
Blue = B, Green = b

Hair
Hair = H, Bald = h

A. Must she have hair? Explain. Yes. She must be purebred (HH) for hair as Squidward does not have the hair trait.

B. Must she be blue? Explain. No. Squidward is purebred for blue so all his offspring will get the dominant blue trait from him.

C. Squidward has found a potential bride prospect with the green squid Octavia. While Octavia has hair, her father does not. Determine the chances of their child being blue and having hair.

Squidward's Genotype = BBhh Octavia's Genotype = bbHH

Bh

bH
bh

D. Use the genotypes in above to complete the Punnett square below and then answer the questions.

| | | | | |
|----|------|--|--|--|
| | Bh | | | |
| bH | BbHh | | | |
| bh | Bbhh | | | |
| | | | | |
| | | | | |

E. Answer these questions based on your Punnett square.

For which traits, if any, is it possible for their offspring to be purebred? Baldness

What is the probability of their children being heterozygous for both traits? 50%