Name:_____   Date: _____

Exploring Trait Patterns in Offspring

Scenario 1

The purple trait is the dominant trait. The parent with purple flowers has two different alleles, an allele for purple flowers (P) and an allele for white flowers (p).

What pattern would you expect to see in the offspring of two pea plants if one parent pea plant has purple flowers and one parent pea plant has white flowers?

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What two alleles does the parent with white flowers have? How do you know?

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_____

Set up the Punnett square to show the two alleles of one parent at the top of the square, and the two alleles for the second parent on the left side of the square. Fill in the four boxes to show the possible gene combinations of the offspring. Then add up the number of times each allele combination and trait occurs and record those numbers in the space provided.

Number of times each allele combination occurs:
    PP = _____
    Pp = _____
    pp = _____

Number of times each trait occurs in the offspring:
    Purple flowers = _____
    White flowers = _____

    Ratio of purple flowers to white flowers = _____

In previous crosses between parents with two different traits (such as the dachshunds or the duckos), we found that the offspring showed a 3:1 ratio of dominant traits to recessive traits. In this cross between flowers with two different traits, explain why the ratio is **not** 3:1?

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Scenario 2

You have two pet parrots. One is male, and one is female. Both birds have blue feathers, which are a recessive trait. Add the allele descriptions at the top of the Punnett square and on the left side. Then fill in the four boxes and add up the number of allele combinations and traits.

Number of times each allele combination occurs:
    FF = _____
    Ff = _____
    ff = _____

Number of times each trait occurs in the offspring:
    Blue feathers = _____
    Green feathers = _____

    Ratio of green feathers to blue feathers = _____

What do you predict the feather color of the baby parrots will be? Can you be sure of your prediction? Why or why not?

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Scenario 3

In your backyard, you've discovered a couple of frogs. They have spots on their backs, which you know is a dominant trait in this kind of frog, but it's tough to tell female frogs from male frogs. Investigate whether these frogs could have baby frogs without spots on their backs.

What are the possible allele combinations for frogs with spotted backs?

_____

Set up Punnett squares showing each possible combination of the two parents' alleles. (**Hint:** You'll need more than one Punnett square to represent all possible allele combinations.)

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Number of times each allele combination occurs:
    SS = _____
    Ss = _____
    ss = _____

Number of times each trait occurs in the offspring:
    Spots on back = _____
    No spots on back = _____

Ratio of spots on back to no spots on back = _____

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Number of times each allele combination occurs:
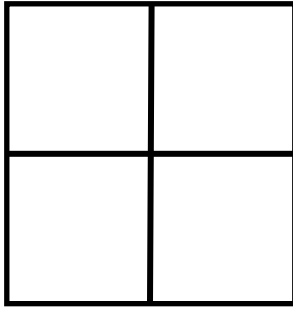   SS = _____
    Ss = _____
    ss = _____

Number of times each trait occurs in the offspring:
    Spots on back = _____
    No spots on back = _____

Ratio of spots on back to no spots on back = _____

Number of times each allele combination occurs:
  SS = _____
  Ss = _____
  ss = _____

Number of times each trait occurs in the offspring:
  Spots on back = _____
  No spots on back = _____

Ratio of spots on back to no spots on back = _____

Is there any possible way these parent frogs would have baby frogs without spots on their backs? Use evidence from the Punnett squares to explain your answer.

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