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Topic: Punnett Square Worksheet - Fruit Fly Genetics

Summary: Students will learn about the genotypes, phenotypes, and probabilities by completing Punnett squares for different characteristics of fruit flies.

Goals & Objectives: Students will be able to determine the probability of different crosses. Students will be able to recognize the differences between inheritance patterns.

NGSS Standards: *HS-LS3-3*. Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.

Time Length: 20 minutes

Prerequisite Knowledge: Students know how to complete a Punnett square for dominant and recessive traits. Students know vocabulary words like homozygous, heterozygous, dominant, recessive, genotype and phenotype. Students know how to calculate simple percentages.

Materials:

Calculators

Class notes or textbook or online textbook:

- <https://flexbooks.ck12.org/cbook/ck-12-biology-flexbook-2.0/section/3.6/primary/lesson/punnett-squares-bio/>
- <https://flexbooks.ck12.org/cbook/ck-12-biology-flexbook-2.0/section/3.5/primary/lesson/probability-and-inheritance-bio/>

Procedures:

1. Students work on the handout by themselves.

Accommodations: Students with an IEP can take the handout home if they need extra time, and/or do the even-numbered questions.

Editable DOCX File and Answer Key:

Available at www.ngsslifescience.com

Punnett Square Worksheet - Fruit Fly Genetics

1) Tan body trait is dominant over the yellow body trait in fruit flies. Fill in the Punnett square and determine the expected genotypes and phenotypes of the F₁ generation by crossing homozygous recessive and homozygous dominant parents.

F₁ generationPossible genotypes of F₁ offspring: _____Possible phenotypes of F₁ offspring: _____Percentage of F₁ offspring that are tan: _____% yellow: _____%Percentage of F₁ offspring that are homozygous dominant: _____%Percentage of F₁ offspring that are heterozygous: _____%Percentage of F₁ offspring that are homozygous recessive: _____%

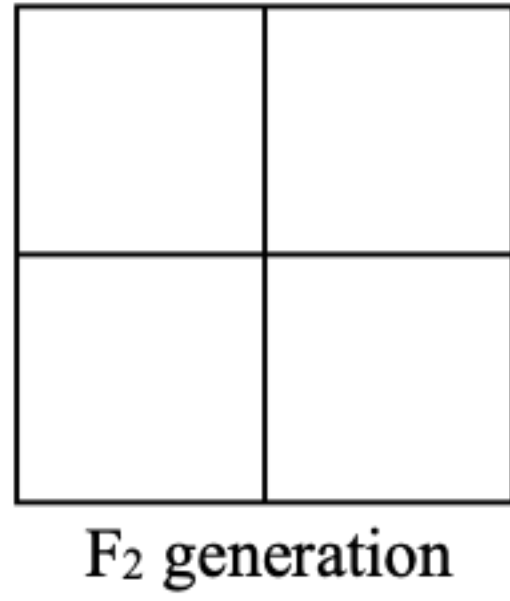
2) Cross a tan male and a tan female from the F₁ generation offspring in question 1. Fill in the Punnett square and determine the expected genotypes and phenotypes of the F₂ generation.

F₂ generationPossible genotypes of F₂ offspring: _____Possible phenotypes of F₂ offspring: _____Percentage of F₂ offspring that are tan: _____% yellow: _____%Percentage of F₂ offspring that are homozygous dominant: _____%Percentage of F₂ offspring that are heterozygous: _____%Percentage of F₂ offspring that are homozygous recessive: _____%

3) Normal wing trait is dominant over the vestigial wing trait in fruit flies. Fill in the Punnett square and determine the expected genotypes and phenotypes of the F₁ generation by crossing heterozygous and homozygous recessive parents.

F₁ generationPossible genotypes of F₁ offspring: _____Possible phenotypes of F₁ offspring: _____Percentage of F₁ offspring with normal wings: _____%Percentage of F₁ offspring with vestigial wings: _____%Percentage of F₁ offspring that are homozygous dominant: _____%Percentage of F₁ offspring that are heterozygous: _____%Percentage of F₁ offspring that are homozygous recessive: _____%

4) Cross a normal wing male and a vestigial wing female from the F₁ generation offspring in question 3. Fill in the Punnett square and determine the expected genotypes and phenotypes of the F₂ generation.



Possible genotypes of F₂ offspring: _____

Possible phenotypes of F₂ offspring: _____

Percentage of F₂ offspring with normal wings: _____%

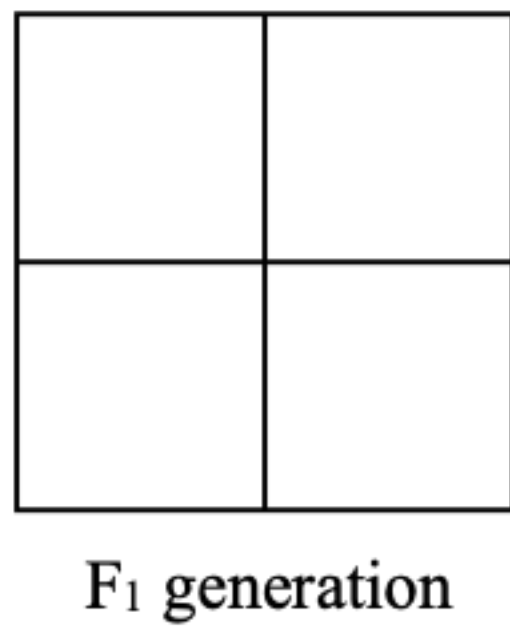
Percentage of F₂ offspring with vestigial wings: _____%

Percentage of F₂ offspring that are homozygous dominant: _____%

Percentage of F₂ offspring that are heterozygous: _____%

Percentage of F₂ offspring that are homozygous recessive: _____%

5) Curly wing trait is dominant over the normal wing trait in fruit flies. Curly wing flies are unable to fly around but they can hop. Fill in the Punnett square and determine the expected genotypes and phenotypes of the F₁ generation by crossing heterozygous curly wing male and a heterozygous curly wing female.



Possible genotypes of F₁ offspring: _____

Possible phenotypes of F₁ offspring: _____

Percentage of F₁ offspring with curly wings: _____%

Percentage of F₁ offspring with normal wings: _____%

Percentage of F₁ offspring that are homozygous dominant: _____%

Percentage of F₁ offspring that are heterozygous: _____%

Percentage of F₁ offspring that are homozygous recessive: _____%

6) Answer the following questions based on crossing a normal wing female and a curly wing male from the F₁ generation offspring in question 5 and the F₂ generation results.

F₂ generation results: 120 curly wing and 0 normal wing offspring.

What are the genotypes of the parents that would create this type of F₂ offspring? _____

Explain why it must be these genotypes: _____

F₂ generation results: 61 curly wing and 57 normal wing offspring.

What are the genotypes of the parents that would create this type of F₂ offspring? _____

Explain why it must be these genotypes: _____