

Topic: Pea Plants Dihybrid Crosses

Summary: Students will complete dihybrid crosses of pea plant traits. Students will be able to figure out the gametes of the parent for two-trait crosses.

Goals & Objectives: Students will be able to predict the probable offspring for two-trait crosses.

Standards: CA Biology 3a. *Students know* how to predict the probable outcome of phenotypes in a genetic cross from the genotypes of the parents and mode of inheritance (autosomal or X-linked, dominant or recessive). 3b. *Students know* the genetic basis for Mendel's laws of segregation and independent assortment.

Time Length: 20 minutes

Materials:

- Textbook
- Handouts

Procedures:

1. Student work alone to answer questions on two trait crosses.

Accommodations: Students with an IEP can take the handout home if they need extra time or if they need modification, only answer the first two problems.

Evaluation:

Filling in the gametes for each of the parents is worth 2 points, for a total of 6 points. Completing the punnett squares correctly is worth 2 points each, for a total of 10 points. Answering the questions about each cross is worth 2 points, for a total of 8 points. This assignment is worth a total of 24 points.

Pea Plants Dihybrid Crosses

1) In pea plants, round seeds and tall plants are dominant to wrinkled seeds and short plants. Use the punnett square below to determine the possible offspring from a cross between one plant that is heterozygous for both traits and a plant that is heterozygous for round seeds and short.

	RT	Rt	rT	rt
Plant 1 Parent Round, Tall <u>RrTt</u>				
<u>RT</u> <u>Rt</u> <u>rT</u> <u>rt</u>				
Plant 2 Parent Round, Short <u>Rrtt</u>				
_____ _____ _____ _____				

Possible Genotypes: _____

Phenotypic Ratios: _____

2) In pea plants, long stems and yellow seeds are dominant to short stems and green seeds. Use the punnett square below to determine the possible offspring from a cross between one plant that is homozygous for long stems and heterozygous for yellow seeds and a plant that has short stems and is homozygous for yellow seeds.

Long, Yellow _____ _____ _____ _____				
Short, Yellow _____ _____ _____ _____				

Possible Genotypes: _____

Phenotypic Ratios: _____

3) In pea plants, purple flowers and axil flower position are dominant to white flowers and terminal flower position. Use the punnett square below to determine the possible offspring from a cross between one plant that is homozygous dominant for both traits and a plant that is homozygous recessive for both traits. The F₁ plants were allowed to self-pollinate to create the gametes of the second punnett square.

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	F₁	F₂																																	

Possible F₂ Genotypes: _____

F₂ Phenotypic Ratios: _____

4) Two purple flower, yellow seed pea plants were crossed. They produced 32 offspring plants: 18 purple flower / yellow seed plants, 6 white flower / yellow seed plants, 6 purple flower / green seed plants, 2 white flower / green seed plants. Use the punnett square below to figure out the genotypes of the parents. First figure out the probabilities of the offspring and then relate their phenotypic ratios to the ratios of the other questions.

Phenotypic Ratios: _____

What were the genotypes of the parents? _____

<p>_____</p> <p>-----</p> <p>_____</p> <p>-----</p>	<table border="1" style="width: 100%; height: 100%; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </table>																