Name: _____

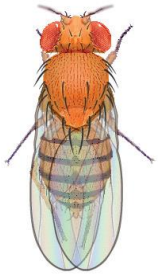
CASE

Activity 7.1.3 Experiment 4 Vestigial Wing, Ebony Body

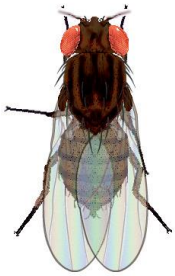
Background

In this experiment, you will examine the inheritance of two genes found on different chromosomes in fruit flies. The genes in this experiment are the vestigial wing and ebony body genes. Bold wild genes are dominant over the mutant genes.

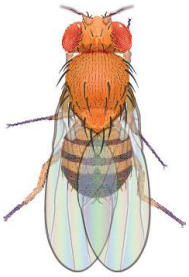
The examination of two genes is referred to as a dihybrid cross. The genotype of a fruit fly that is homozygous for both wild traits will be represented as *VVEE*, while the genotype of a fly that is homozygous for both mutant traits is represented as *vvee*.



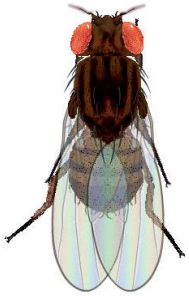
Wild Female



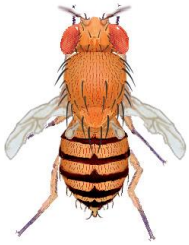
Ebony Body Female



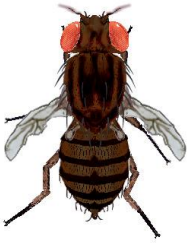
Wild Male



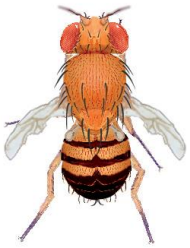
Ebony Body Male



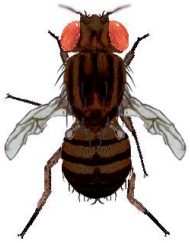
Vestigial Wing Female



Vestigial Wing and Ebony Body Female



Vestigial Wing Male



Vestigial Wing and Ebony Body Male

Procedure

1. Open the Drosophila Genetics Lab on your computer as instructed by your teacher.
2. Click on the ***Reset*** button and then ***Select*** button.
3. Select ***Saved Parents*** and then ***Exp04_f.mfp*** or ***Exp04_m.mfp*** (*f* stands for female, while *m* stands for male).
4. Drag each of the parents over to the ***Observation Platform*** and record their phenotype and genotype in question 1 of the Predictions.
5. Compete questions 2 and 3 of the Predictions to determine the probability of wild flies and mutant flies in this mating.
6. Click the ***Breed*** button. Examine and record the phenotype of 100 offspring in Table 1.
7. Complete question 1 of the Results Analysis.
8. Drag one male and one female into the ***Hold Jar***.

9. Empty the ***Parent/Offspring*** area.
10. Drag the held flies into the ***Parent*** jar and select ***Breed***. This is your Hybrid, or F1, cross.
11. Examine each parent from the hybrid cross and record their phenotype and genotype in question 4 of Predictions.
12. Compete questions 5 – 7 of the Predictions to determine the probability of wild wing flies and wild wing flies in this mating.
13. Examine and record the phenotype of 200 offspring in Table 2. Complete questions 2 and 3 of the Results Analysis.

Predictions

1. Determine the information below for each of the original parents, one of which is a homozygous wild individual and the other a homozygous mutant individual.

Parent	Phenotype	Genotype
Female		
Male		

2. Complete the Punnett Square for the parent cross.

Genes from the male

Genes from the female	_____	_____	_____	_____
_____				
_____				
_____				
_____				

3. What would you expect the ratio of wild flies to mutant flies to be in the Punnett Square you just completed?

_____ wild : _____ mutant

4. Determine the information below for each of the hybrid parents, who are both heterozygous, in your F1 cross.

Parent	Phenotype	Genotype
Female		
Male		

5. Complete the Punnett Square for the hybrid cross.

Genes from the male

Genes from the female	_____	_____	_____	_____
_____				
_____				
_____				
_____				

6. What would you expect the ratio of wild : vestigial : ebony : vestigial and ebony flies to be in the Punnett Square you just completed?

_____ wild : _____ vestigial : _____ ebony : _____ vestigial & ebony

Results Analysis

Table 1. ***Parent Cross Results***

Parent Description							
Female Genotype _____				Male Genotype _____			
Female Phenotype _____				Male Phenotype _____			
Wild Flies		**Vestigial Wing Flies**		**Ebony Bodied Flies**		**Vestigial Wing & Ebony Bodied**	
Female	Male	Female	Male	Female	Male	Female	Male
Total =		Total =		Total =		Total =	
Ratio of Wild : Mutant :							

1. How does the ratio of flies observed in the hybrid cross experiment compare to the ratio predicted in your Punnett Square?

Table 2. ***Hybrid Cross Results***

Parent Description							
Female Genotype _____				Male Genotype _____			
Female Phenotype _____				Male Phenotype _____			
Wild Flies		**Vestigial Wing Flies**		**Ebony Bodied Flies**		**Vestigial Wing & Ebony Bodied**	
Female	Male	Female	Male	Female	Male	Female	Male
Total =		Total =		Total =		Total =	

Ratio of Wild : Vestigial : Ebony : Vestigial & Ebony

_____ : _____ : _____ : _____

2. How does the ratio of flies observed in the hybrid cross experiment compare to the ratio predicted in your Punnett Square?

3. Why might there be differences in the observed and predicted phenotypic ratios?