

Lab 1 Single Gene Inheritance - Wing Size

Name: Xander Webb

Procedure: 15 / 40

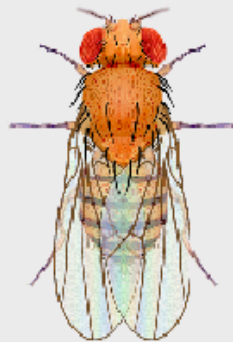
Results & Qus: 29 / 40

Total Score: 44 / 80 = 55%

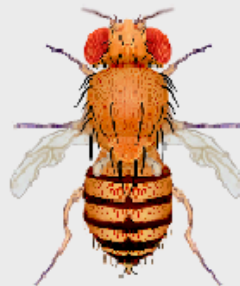
Overview:

The common allele for wing size normally results in the fly having wild full wing. However, Morgan found a variety of *Drosophila* having a different allele which cause the wing to become twisted and useless. The new allele is called vestigial wing and is found on the second chromosome.

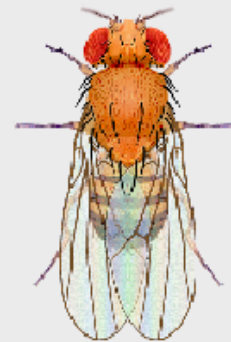
Wild is dominant over vestigial wing and so a hybrid fly, which has both a wild and the other allele, would have wild wing size. The symbol used for the wild allele is **V** and the other **v**.



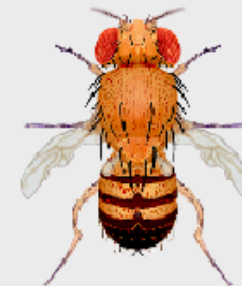
Wild Female



Vestigial Wing Female



Wild Male



Vestigial Wing Male

Objective:

To examine the inheritance of a single gene which governs wing size in *Drosophila melanogaster* fruit flies.

Aims:

1. Collect data for three generations of *Drosophila melanogaster* fruit flies.
2. Observe the inheritance patterns over these generations.
3. Construct Punnett Squares and answer questions concerning these generations.



Procedure 1 - First Generation (F1 or parent cross)

1. Click the **Lab Book** tab to view the procedure, results and questions. To make using the procedure instructions easier, drag the bar at the top of these instructions down to the bottom of the offspring jar, several lines of writing are still visible. The instructions and results can then be scrolled or dragged as needed.
2. Your parents have already been selected. Click each of the parents in turn to move them over to the observation platform and record their phenotype and genotype in the results table 1 below.
3. Click the 'Breed' arrow (2). 100 offspring should appear.
4. View the first offspring by dragging it to the view area and record the phenotype, count the remaining offspring by clicking on the counters in table 1. Clicking the counters will automatically dispose of the current fly being viewed and bring in the next offspring. Count at least 40 flies.
5. Alternatively, you can use your own counting system and simply enter the totals in the tables. Clicking the 'Observe' arrow (3) will display the next offspring without altering the counter.
6. When you have nearly finished counting, drag two of the offspring after being observed to the 'Future Parents' jar. Make sure you count them, by using the counters, after you place them in the jar.
Important: count the last fly by removing it from the stage then clicking the counter.

0/5

Table 1 Parent Cross Results

Parent Description			
Female phenotype:	Vestigial Wing ▼	Genotype:	vv ▼
Male phenotype:	Wild ▼	Genotype:	VV ▼

Wild Offspring	Vestigial Wing Offspring
	
Total Wild = 64 ✗	Total Vestigial Wing = 0 ✓
Offspring Ratio Wild : Vestigial Wing 1 : 0 ✓	



5/12



Procedure 2 - Second Generation (F2 or hybrid cross)

1. After ensuring that two offspring have been placed in the 'Future Parents' jar. Empty the 'Parent' and 'Offspring' jars by using the 'Empty' buttons below each.
2. Drag the 'Future Parents' into the 'Parent' jar and breed them before you examine and record them in table 2. They are still offspring until they are bred and so their genotype may not be visible.
3. Record the phenotypes of at least 100 offspring, then answer the questions below. The parents can be bred repeatedly using the 'Breed' arrow.

0/5

Table 2 Hybrid Cross Results

Hybrid Description			
Female phenotype:	Wild ▼	✓ Genotype:	Vv ▼ ✓
Male phenotype:	Wild ▼	✓ Genotype:	Vv ▼ ✓
Wild Offspring		Vestigial Wing Offspring	
			

	
Total Wild = 75 ✗	Total Vestigial Wing = 25 ✗
Offspring Ratio (to 1 decimal place) Wild : Vestigial Wing 3 : 1 ✗	

10/18

Questions

- Complete the following table, which deals with the original **parent cross**, between a pure breeding wild fly and a pure breeding wild fly. Information from Table 1 has been used to fill in phenotype and genotype for you.

Table 3 Genotypes of Gametes

Parent	Phenotype	Genotype	Gametes
Female	Vestigial Wing	vv	v ✗
Male	Wild	VV	V ✗

0/4

- Complete the Punnett Square below for the **parent cross** by dragging the gametes into each box. Gametes in table 3 must be selected.

Female Parent

Phenotype: Vestigial Wing

Genotype: vv

Male Parent

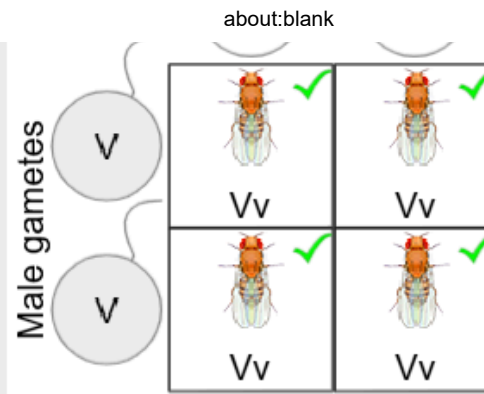
Phenotype:

Female gametes

v

v

Wild
Genotype:
VV



8/8

3. By referring to the Punnett Square above, what would you expect the ratio of **wild** : **vestigial** flies to be?

4 : 0 ✗

1/2

4. How well does the ratio of **wild** : **vestigial** flies observed in your experiment compare to the ratio predicted by the Punnett Square and why?

Ratios match exactly, they always do for this cross. ▼ ✓

3/3

5. Complete the following table, which deals with the original hybrid cross in which the first offspring are bred to produce the second generation of offspring. Information from Table 2 has been used to fill in phenotype and genotype for you.

Table 4 Genotypes of Gametes

Parent	Phenotype	Genotype	Gametes
Female	Wild	Vv	V and v ▼ ✓
Male	Wild	Vv	V and v ▼ ✓

4/4

6. Complete the Punnett Square below for the **hybrid cross** by dragging the gametes into each box. Gametes in table 4 must be selected.

Female
Parent

Phenotype: Wild
Genotype: Vv

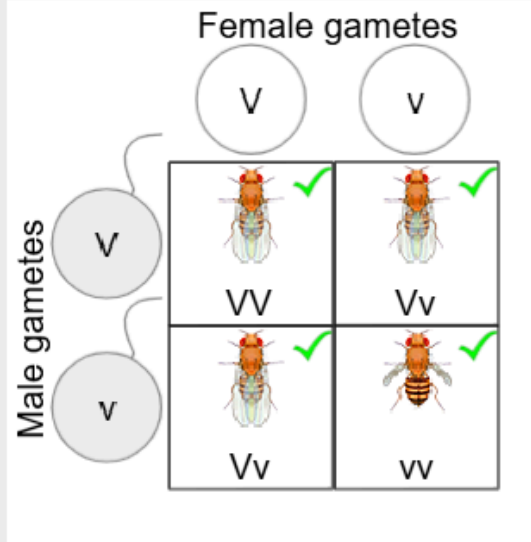
Male Parent

Phenotype:

Wild

Genotype:

Vv



8/8

7. From the Punnett Square above, what would you expect the ratio of **wild** : **vestigial** flies to be?

3 : 1 ✓

2/2

8. From the Punnett Square above, what would you expect the ratio of **VV** : **Vv** : **vv** genotypes to be?

1 : 2 : 1 ✓

3/3

9. How well does the ratio of **wild** : **vestigial** flies observed in table 2 compare to the ratio predicted by the Punnett Square and why?

Ratios match exactly, they may not always match. ▼ ✗

0/3

10. Why would you expect a difference, between the observed and predicted phenotypic ratios?

Crossing over does not occur every time. ▼ ✗

0/3

Ensure you have completed your name, the tables and all the questions correctly. To mark your lab select the **tick icon** on the Lab Book top bar. Answers can be changed after marking, however the marks are

unchanged.

Answers to Additional Questions set by Teacher:

No additional questions