

How to Begin

The screenshot shows the eMind Fly software interface. At the top, it says "eMind Fly EXPANDABLE MIND SOFTWARE". Below this are two large images of fruit flies. To the right is a vertical menu of five circular icons representing different genetic experiments. At the bottom left is an "Exit" button, and at the bottom right is an "About" button with a help icon.






Click the F1 Monohybrid Cross icon to begin exploring genetic crosses in the recommended sequence

Click any of these icons to begin exploring other genetic crosses

Click here to open the Fly Editor and conduct your own genetics investigations

Click here to exit the lesson

Click here to navigate through the program

- 
F1 Cross
 Investigate a cross between homozygous normal-winged and homozygous vestigial-winged flies.
- 
F2 Cross
 Cross two heterozygous flies from the F1 Cross.
- 
Sex-Linked Cross
 Study how traits carried on the X chromosome are inherited differently by males and females.
- 
Dihybrid Cross
 Simultaneously consider the inheritance of two different traits.
- 
Fly Breeder
 Use the Fly Editor to select one of twenty-six different traits. Use the Fly Breeder to complete a F1 and F2 cross. Then use your data to determine the pattern of inheritance.

Completing the Fly Experiments

As you complete each fly experiment, **eMind Fly** enables you to review topics and test your knowledge with post-labs.

1. Click the **F1 Monohybrid Cross** button on the home page.
2. Begin the pre-lab by dragging the genes to their correct locations in the parents' genotypes.
3. Click **Next**.
4. Continue the pre-lab by dragging the genes to their correct locations on the Punnett square diagram.
5. Click **Next**.
6. Continue the pre-lab by clicking your prediction about the genetic makeup of the offspring to be created by the breeding of the parent flies.
7. Click **Next**.
8. Begin the experiment by dragging the flies to the containers and completing the breeding process as directed by the program.
9. Verify the accuracy of your prediction from the pre-lab.
10. Complete the post-lab quiz.
11. Continue to the next experiment.

COMPLETING THE EXPERIMENTS

Identifying Genes Pre-Lab A

Experiment 1 Pre-Lab A

This first experiment involves a F1 cross between a purebred normal winged male and a purebred vestigial winged female. Vestigial (stubby and underdeveloped) wings are recessive to normal wings. Follow the procedure below to complete Part A of the pre-lab.

Procedure
Part A: Determining the Genotype
 Before we start the experiment, we will determine the genotype of both parents. The **W** represents the gene for normal wings, which is dominant and the **w** represents the gene for vestigial wings, which is recessive. Click on a letter and drag it to the appropriate box. Continue this procedure until you have completed the genotypes of both parents. Then click on the Next button to move to Part B.

Vestigial Female: **W** **W**

Normal Male: **W** **w**

Available genes: **W** **w**

Home

Drag genes to the correct space below each parent fly

A dimmed W indicates that you have placed the entire complement of that gene

Drag the genes from here to the spaces above

Completing the Punnett Square Pre-Lab B

Experiment 1 Pre-Lab B

Procedure
Part B: Completing a Punnett Square
 Now we will use a Punnett square to help us make a prediction about the offspring. The two **w**'s to the right of the vestigial female represent her alleles for wing type. The two **W**'s below the normal male represent his alleles for wing type. Complete the Punnett square by dragging the letters to their appropriate box. When all eight letters have been moved click the Next button to proceed to Part C.

Normal Male: **W** **W**

Vestigial Female: **w** **w**

	W	W
w	Ww	Ww
w	Ww	Ww

Home

A dimmed W indicates that you have placed the entire complement of that gene

Drag genes to complete the Punnett square

Experiment 1 Pre-Lab C

Part C: Predicting
 Before we mate the two flies from the parent generation, let's make a prediction about the phenotypes of the F1 offspring. Click on one of the four F1 possibilities below. When you have made your decision, click on the Next button to conduct an experiment and breed the parent flies to test your prediction.

Normal Male: **W** **W**

Vestigial Female: **w** **w**

	W	W
w	Ww	Ww
w	Ww	Ww

All Normal-winged offspring.
 All Vestigial-winged offspring.
 50% Normal / 50% Vestigial.
 75% Normal / 25% Vestigial.

Next

Making Predictions Pre-Lab C

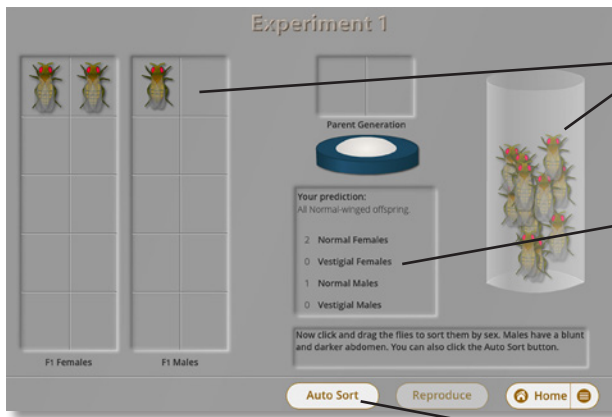
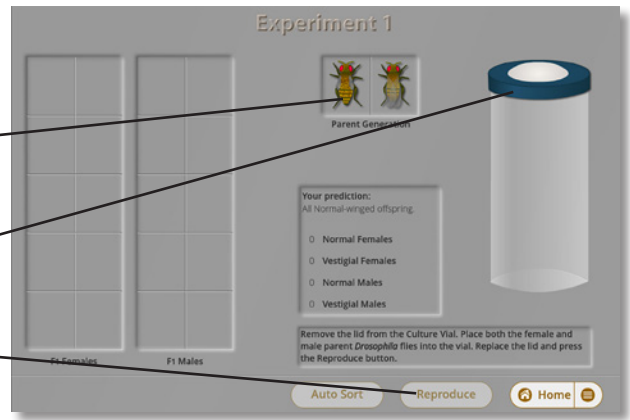
Predict the outcome of the genetic cross

Breeding Flies Experiment 1

Drag parent flies to the culture vial, then return the lid

Click the culture vial lid to open and seal the vial

Click the Reproduce Button once the parent flies are in the vial.

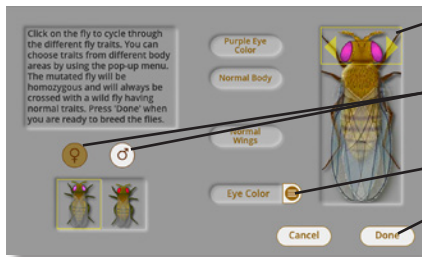


Drag the fly offspring from the vial and sort them by gender on the examination chart

As you place offspring, this table summarizes their traits

Click here to automatically distribute offspring to the examination chart

U S I N G T H E F L Y B R E E D E R



Click in the yellow outlined area to cycle through the different variations of a trait

Click here to choose the sex of the parent with the selected trait

Choose a trait to test from the popup menu

Click here to continue to the Fly Breeder

Choosing A Fly Trait The Fly Editor

Drag parent flies to the culture vial, then seal it

Drag offspring to their places on the examination chart for the F1 cross. Then drag a male and female fly to the vial to produce the F2 generation.

Producing F1 and F2 Generations The Fly Breeder

Click here to initiate the breeding process

Click here to automatically distribute the offspring to their correct locations

