

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## Genetics with *Drosophila* F<sub>1</sub> Crosses

*Drosophila* (fruit flies) have been used to study genetics for more than 100 years. In fact, much of what we know about how traits are inherited was first discovered in experiments using *Drosophila*. Wild-type flies express the phenotypes commonly found among members of wild populations of *Drosophila*. Wild-type flies have red eyes, wings of normal length and shape, gray body color, etc. Various mutant strains of fruit flies have brown eyes, reduced or absent wings, dark body color, etc. In this activity you will use F<sub>1</sub> flies that result from a cross of female mutant flies and wild-type male flies (monohybrid), or a cross of two mutant strains of flies (dihybrid).

### Observing F<sub>1</sub> Flies and Setting Up F<sub>2</sub> Cultures

#### Materials

- 12 anesthetized F<sub>1</sub> flies on an index card
- vial with medium and plug
- vial label
- sorting brush
- index card
- stereomicroscope

#### Procedure

Place the index card with flies under a stereomicroscope for observation.

Note the eye color and wing type of your F<sub>1</sub> flies here.

Eye color \_\_\_\_\_

Wing type \_\_\_\_\_

Transfer your flies into your vial of medium and plug the vial. Label the vial with the date, your initials or group number, and "F<sub>2</sub>." Leave the vial in the place indicated by your instructor.

#### Questions

1. What is the genotype of the F<sub>1</sub> flies?

\_\_\_\_\_

2. Which phenotype(s) result from the action of a dominant allele(s). How do you know?

\_\_\_\_\_

3. What are the expected phenotypes and their ratios in the F<sub>2</sub>?

\_\_\_\_\_

## Clearing F<sub>1</sub> Parents from the F<sub>2</sub> Vials

Seven to ten days after the F<sub>2</sub> vials are set up, the F<sub>1</sub> flies need to be removed from the F<sub>2</sub> cultures.

### Materials

FlyNap<sup>®</sup> Kit with morgue  
sorting brush  
index card

### Procedure

Anesthetize the flies and dump them out of the vial onto an index card. Drop them into the morgue.

### Question

4. Why is it necessary to remove the F<sub>1</sub> flies?
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## Scoring Phenotypes

Begin scoring (counting and categorizing) phenotypes of the F<sub>2</sub> culture on the day after they first begin emerging. For scoring the phenotypes you will need your vial of F<sub>2</sub> flies and the following materials.

### Materials

FlyNap<sup>®</sup> Kit with morgue  
sorting brush  
index card  
dissecting microscope

### Procedure

Anesthetize the flies and dump them onto an index card. Place the card under a stereomicroscope and sort them based on their phenotypes. Record your counts in the Data Table. You should record 2 phenotype classes for a monohybrid cross and 4 for a dihybrid cross.

Parental Cross \_\_\_\_\_ □ \_\_\_\_\_  
Female Parent Male Parent

F<sub>2</sub> Cross (give genotype) \_\_\_\_\_ □ \_\_\_\_\_  
Female Parent Male Parent

## Data Table

F<sub>2</sub> Phenotypes and Numbers of Flies

Date Counted	Phenotype 1	Phenotype 2	Phenotype 3	Phenotype 4
<b>Total</b>				
<b>Expected Ratio</b>				

## Question

5. Are your results compatible with your expected ratios? Explain.

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