# Observing Wild-Type Worksheet

## Observations and Analysis

Vial Number _____

| Distinguishing Features | Comparisons | |
|---|---|---|
| | **Male** | **Female** |
| Length of an adult (mm) | | |
| Pattern of banding on abdomen | | |
| Shape of the tip of the abdomen | | |
| Sex combs present or absent | | |
| External genitalia present or absent | | |
| Eye color | | |

## Questions

1. Why is it necessary to use a stereoscope when examining *Drosophila*?

2. Describe a male wild-type fly in detail.

3. Describe a female wild-type fly in detail.

# Crossing *Drosophila* Worksheet

## Observations and Analysis

Vial Number _____

## Table 1

| Parental Generation (P) | | |
|---|---|---|
| **Gender** | **Phenotype** | **Symbol** |
| Male | | |
| Male | | |
| Male | | |
| Female | | |
| Female | | |
| Female | | |

## Table 2

| Date | $F_1$ Generation Egg and Larva Observations |
|---|---|
| | |
| | |
| | |
| | |
| | |

## Table 3

| $F_1$ Generation | | | |
|---|---|---|---|
| **Phenotype** | **Genotype Symbol** | **Males** | **Females** |
| | | | |
| | | | |
| | | | |
| | | | |

## Table 4

| Date | $F_2$ Generation Egg and Larva Observations |
|---|---|

## Table 5

| $F_2$ Generation | | | |
|---|---|---|---|
| **Phenotype** | **Genotype Symbol** | **Males** | **Females** |
| | | | |
| | | | |
| | | | |
| | | | |

# Questions

1. Is this a monohybrid, dihybrid or sex-linked cross?

2. Write a hypothesis that describes the mode of inheritance of the trait(s) you studied. This is your null hypothesis.

3. Refer to a biology textbook and review Punnett squares. In the space below, construct two Punnett squares to predict the expected results of both the parental and $F_1$ crosses from your null hypothesis.

| **Parental Cross** | | | | **F1 Cross** | | |
|---|---|---|---|---|---|---|
| **Gamete** | | | | **Gamete** | | |
| | | | | | | |
| | | | | | | |

4. Refer to the Punnett squares created in question 3. In the table below, record the expected ratios for the genotypes and phenotypes of the $F_1$ and $F_2$ crosses in the experiment.

| | **Expected Genotypic Ratio** | **Expected Phenotypic Ratio** |
|---|---|---|
| $F_1$ Generation | | |
| $F_2$ Generation | | |

5. Do the actual results match or deviate from what was expected? Explain.

6. Describe your cross by answering the following questions:

   *a.* Is the mutation sex-linked or autosomal?

   *b.* Is the mutation dominant or recessive?

   *c.* Is the cross a monohybrid or a dihybrid?

# Statistical Analysis Worksheet

## Observations and Analysis

| Phenotype | # Observed (o) | # Expected (e) | (o − e) | (o − e)$^2$ | $\dfrac{(o - e)^2}{e}$ |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  | $x^2$ |  |

1. How many degrees of freedom are there in this experiment?

2. Based on the chi-square value and the degrees of freedom, what is the probability that the number of flies of each phenotype match the number predicted based on the pattern of inheritance?

## Question

1. According to the probability value calculated for the data, can the null hypothesis be accepted? Explain why or why not.