COURSE: BIOL3001 GENETICS NAME:

LABORATORY 3, EXERCISE 1. ADVANCED MODES OF INHERITANCE

Purpose

The purpose of this exercise is to allow you to discover patterns that distinguish among four (4) Advanced Modes of Inheritance (MOI) and to incorporate this information into your problem solving techniques for these types of problems. Your TA will walk you through this Exercise step by step. You will be responsible for completing the remaining exercises on your own.

Exercise Protocol

Your assignment is:

1. To diagram crosses (Parental, F1 and F2 Generations) showing the different expected outcomes of phenotypes produced by one of the four Modes of Inheritance given below.
2. Be sure to include the RECIPROCAL cross when asked for each diagram.
3. Keep in mind you may have 1, 2 or even 3 possible phenotypes in the F1 and F2 generations for any particular trait depending on MOI. If multiple F1 crosses are possible, you need only show one example.

Steps for this Exercise:

1. You will need to select a set of traits for this for this exercise. Make note of the set you choose; you will need to enter the traits individually in specific boxes on the following pages.
2. Note which traits you are examining:

SET 1 – ☐ Trait 1 - Body color: Sable
Trait 2 - Wing Shape: Crumpled

SET 2 ☐ Trait 1 - Bristle: Sternoplural
Trait 2 - Wing Shape: Stubby

3. Diagram the crosses you would expect to see from the Parental, the F1 and the F2 Generations showing the outcomes you would EXPECT from each of the four indicated Modes of Inheritance.

4. Record the results on the data sheet for LABORATORY EXERCISE 1. Take a moment to think about your results.
    a. *Do the offspring look like either parent?*
    b. *Are the numbers of males and females equal for each phenotype?*
    c. *Are both the mutant and Wild phenotypes present?*
    d. *Did any new phenotypes appear?*

5. Consider your observations regarding these crosses and answer the question following each inheritance mode.

GENETIC CROSS

LAB 3 EXERCISE 1 - DATA SHEET

NAME:

SIMPLE MENDELIAN DOMINANCE/RECESSIVE INHERITANCE

TRAIT 1:

TRAIT 2:

CROSS DIAGRAM

Parentals	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F1 Generation	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F2 Generation

Phenotypes and Explanation of Results

Phenotypic Ratio

RECIPROCAL CROSS DIAGRAM

Parentals	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F1 Generation	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F2 Generation

Phenotypes and Explanation of Results

Phenotypic Ratio

Do you expect to see a different result in inheritance with a reciprocal cross for this MOI? Explain why or why not.

SEX LINKAGE INHERITANCE

TRAIT 1:

TRAIT 2:

CROSS DIAGRAM

Parentals	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F1 Generation	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F2 Generation

Phenotypes and Explanation of Results

Phenotypic Ratio

RECIPROCAL CROSS DIAGRAM

Parentals	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F1 Generation	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F2 Generation

Phenotypes and Explanation of Results

Phenotypic Ratio

Do you expect to see a different result in inheritance with a reciprocal cross for this MOI? Explain why or why not.

INCOMPLETE DOMINANCE INHERITANCE

TRAIT 1:

TRAIT 2:

CROSS DIAGRAM

Parentals	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F1 Generation	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F2 Generation

Phenotypes and Explanation of Results

Phenotypic Ratio

RECIPROCAL CROSS DIAGRAM

Parentals	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F1 Generation	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F2 Generation

Phenotypes and Explanation of Results

Phenotypic Ratio

Do you expect to see a different result in inheritance with a reciprocal cross for this MOI? Explain why or why not.

RECESSIVE LETHAL INHERITANCE

TRAIT 1:

TRAIT 2:

CROSS DIAGRAM

Parentals	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F1 Generation	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F2 Generation

Phenotypes and Explanation of Results

Phenotypic Ratio

RECIPROCAL CROSS DIAGRAM

Parentals	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F1 Generation	**Male**		**Female**	**RESULTS**
Phenotype		**x**		
Genotype		**x**		

F2 Generation

Phenotypes and Explanation of Results

Phenotypic Ratio

Do you expect to see a different result in inheritance with a reciprocal cross for this MOI? Explain why or why not.