**Unit 3IP – Biology**

**Using the Laws of Inheritance -**

Gregor Mendel's studies laid the foundation for modern genetics. In a series of elegant experiments, Mendel was able to deduce the most fundamental laws of single-gene and multiple-gene inheritance without having the scientific data on chromosomes, their structure, or meiotic segregation. In this lab, **you will learn about and apply examples for 3 different patterns of human inheritance of traits.**

In this lab, you will view information and complete activities to answer the following questions about genes and inheritance:

* **What is a Punnett Square? How can it be used to analyze possible genetic outcomes for offspring?**
* **What is dominant/recessive inheritance?**
* **What is X-linked inheritance?**
* **What is codominant inheritance of genes?**

Using the M.U.S.E. link, review the background information and animation to complete your report. Use the [lab 3 worksheet](https://class.aiuniv.edu/LCMSFileShareCommon/f9b/972/b3e/1d2/44b/88c/1ee/aae/ebe/28d/2d/SCIE207_Lab3_worksheet_REV.doc) for assignment instructions and data collection.

**Student Sheet**

**Name:**

**Date:**

**Instructor’s Name:**

**Assignment: SCIE207 Phase 3 Lab Report**

**Title: Lab to Determine the Outcome of Heredity**

**Instructions:** You will fill out the Punnett squares and answer a set of questions for each exercise**.**

**When your lab report is complete, submit this document to your instructor in your assignment box.**

Using what you learned on the lab animation (and the images below), you will fill in the following Punnett squares and answer the questions that follow:

**Exercise 1: Color Blindness**

1. Choose the parental gametes, and align these in the correct positions around the Punnett square. (Type in the correct gametes. Pink are the female gametes, and blue are the male gametes. XC is the gene for normal vision, and Xc is the gene for color blindness.)

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1. Choose the correct genotype of the progeny to fill in the Punnett square.

(Type the correct genotypes in the boxes.)

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| **Question** | **Answer** |
| What is the genotype of the mother? |   |
| What is the genotype of the father? |   |
| What are the possible phenotypes of their children? |   |
| What is the probability of the color blind trait in female children and the probability of the color blind trait in male children?  |   |
| X and Y genes code for male and female gender. XX is female and XY is male. Why is XcY color blind, but XcXC not color blind? Can an XcXC female pass the color blind trait to her children?  |  |

**Exercise 2: Freckles**

1. Choose the parental gametes and align these in the correct positions around the Punnett square. (Type in the correct gametes. The pink are female gametes, and the blue are male gametes.)
2. Choose the correct genotype of the progeny to fill in the Punnett square.

(Type in the genotypes.)

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| **Question** | **Answer** |
| What is the genotype of the mother? |   |
| What is the genotype of the father? |   |
| What are the possible phenotypes of the children? |   |
| What is the probability of freckles in their children? |   |
| Freckles in humans are inherited by which pattern: dominant/recessive, incomplete dominance, or codominance? Why does the mother have freckles, even though she has a gene for no freckles? Why does the father have no freckles? |  |

**Exercise 3: Blood Type**

A male has Type A blood, and a female has Type B blood. Could they have a child with Type O blood? Demonstrate how this is genetically possible by filling out the Punnett square.

Choose the correct parental gametes from all of the potential blood type gametes below, and align these in the correct positions around the Punnett square. (Type in the correct gametes. The pink are female gametes, and the blue are male gametes.)

1. Choose the correct genotypes of the progeny, and fill in the Punnett square.

(Type the correct genotypes into the boxes from the possible genotypes shown below).

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| **Question** | **Answer** |
| What is the genotype of the mother? |   |
| What is the genotype of the father? |   |
| What are possible phenotypes of their children? |   |
| What is the probability of Type AB blood in their children? |   |
| Ms. Johnson is suing her former husband for potential child support payments for her 2-year-old child. Mr. Johnson’s attorney forcefully denies the fatherhood of his client, stating that the child of Ms. Johnson has blood type O, while the blood type of Mr. Johnson has Type A blood. The lawyer claims that Mr. Johnson cannot be the father of a child with Type O blood. Is the attorney right? Why or why not? Explain your answer. |  |

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