

## Dihybrid Crosses: Background Information

### **Targeted Standard Course of Study Goals and Objectives:**

**Goal 1: Learner will develop abilities necessary to do and understand scientific inquiry.**

**1.01** Identify biological problems and questions that can be answered through scientific investigations.

**1.02** Design and conduct scientific investigations to answer biological questions.

**Goal 3: Learner will develop an understanding of the continuity of life and the changes of organisms over time.**

**3.03** Interpret and predict patterns of inheritance.

### **Essential Question(s):**

What is the significance of scientific investigation?

How does a scientist design and perform an inquiry-based scientific investigation considering controls, variables, and data analysis?

How do genes and the environment interact to produce a phenotype?

Can we simulate a model illustrating the principle of independent assortment while supporting the probability of a dihybrid heterozygous cross?

### **Introduction to teacher:**

Before beginning this activity, the students should understand basic genetics vocabulary, have studied Mendel's Principles, and should be able to perform monohybrid and dihybrid crosses. The students should be able to indicate genotypic and phenotypic ratios from these crosses. This activity allows the students to compare the probable outcomes of a heterozygous dihybrid cross with actual outcomes that they generate and analyze these results.

The activity requires that the students use 2 "silver" coins (quarters, dimes, nickels) and 2 pennies. You may want to tell the students of this requirement the day before and have extras on hand just in case. They will also need graph paper, so either you will need to provide it, or they must bring it in.

You could change this lab so that, instead of coins, the students use M & M candies. Use different colors to represent the homozygous dominant and homozygous recessive (so you would need 4 different colors of M&Ms- two colors for each trait). Students would draw M&Ms out of paper bags (one for father and one for mother).

### **Differentiation from Standard-level:**

Honors level students should thoroughly understand dihybrid crosses. The extension and analysis questions also make this activity higher-level. You may further support the independence of your students by removing the data charts supplied and asking students