

**HANDS-ON ACTIVITY**

Modeling the Inheritance and Variation of Traits

In this lab, you will model the distribution of alleles, calculate the probabilities of specific allele combinations, and compare them to those that Gregor Mendel found in his work.

PREDICT

What is the probability that certain genotypes and phenotypes will occur?

MATERIALS

- index card, 3 × 5 in, folded, with a cross on it (e.g., $Aa \times aa$, or $AA \times Aa$)
- marker
- penny (2)
- tape, masking, 4 cm

**PROCEDURE**

1. Using the coins, tape, and marker, label a set of two coins to simulate the cross listed on your group's index card. Use a capital letter to represent a dominant allele and a lowercase letter to represent a recessive allele. One coin should have the mother's gametes. The other coin should have the father's gametes.
2. Flip the two coins simultaneously. The two coins together make up the genetic material of the zygote. Record the genotype of the offspring.
3. Repeat Step 2 for a total of 50 trials. Record the results of your coin tosses in a data table in the space provided.

CALCULATIONS

Calculate what percentage of "offspring" had each possible genotype and phenotype. Show your data and calculations to your teacher before moving on.

ANALYZE

1. The crosses below show the predicted phenotypes of the offspring based on Mendel's laws. Compare your genetic cross results (phenotypes) to those of Mendel. Explain possible reasons for any differences you observe in the data.
 - $AA \times aa$: 100% dominant
 - $aa \times aa$: 100% recessive
 - $Aa \times aa$: 50% dominant, 50% recessive

2. Did the genotype of any one trial depend upon the results of another? Explain.

3. Explain how meiosis accounts for the distribution of alleles to gametes.
