

Penny Genetics

How Well Does a Punnett Square Predict the Actual Ratios?

In this lab you will make predictions using Punnett Squares, you will then use pennies (or chips) to simulate the crosses. Then compare the Actual Ratios with the Predicted Ratios. The trait you are looking at is the gene that codes for a short nose in humans. **T** represents the dominant allele (short nose), **t** is the recessive allele, long nose.

Give the Phenotype (description) in spaces provided.

TT _____ **Tt** _____ **tt** _____

PREDICTED RATIO (part 1)

Use a Punnett Square to predict the ratio of offspring in a cross where the parents are both **Tt**. **Add this data to the "predicted ratios" section below.**

What percent will have TT? _____ What percent will have Tt? _____ What percent will have tt? _____

What percent will have short nose? _____ What percent will have long nose? _____

ACTUAL RATIO (part 2)

Now you will determine the actual ratios by using pennies to represent the crosses. You have two pennies. One side of the penny is the letter T, on the other side is the letter t. **This penny represents a parent that has the genotype Tt.**

ACTUAL RATIO: To determine Actual Ratios, **you will flip your coins 100 times**, recording in the table below how often each combination came up. (Use tally marks to record your data)

Gene Combo	Tally Marks	Total
TT		
Tt		
tt		

Comparing Actual to Predicted Ratios

	Predicted Ratios (part 1)	Actual Ratios (part 2)
TT		
Tt		
tt		
Short Nose		
Long Nose		

Would you consider the actual and predicted ratios the (circle) : a. SAME b. CLOSE TO THE SAME c. NOT CLOSE AT ALL

Part II: What if the Parents are Tt x tt?

Part 1 - First make your predictions by setting up a Punnet square for the parents. **Tt x tt**. **Fill into the predicted ratios table below.**

Part 2 - **See teacher for a short cut.** Flip both pennies at a time. Assume one parent will always be contributing a **t**. Perform the 100 flips with your new set of parents. Record data.

Gene Combo	Tally Marks	Total
Tt		
tt		

Comparing Actual to Predicted Ratios

	Predicted Ratios (part 1)	Actual Ratios (part 2)
Tt		
tt		
Short Nose		
Long Nose		

Analysis

- Do you think the predicted or actual ratio is a better indicator of possible outcomes? Why?
- What do the pennies or chips represent in the simulation? _____
- When you toss the coin to see which side lands up, what Mendelian law are you performing? _____
- When you put the two coins that are flipped together, you are simulating what part of the process of sexual reproduction?
- How realistic is it to actually get the genes that you want in your child?