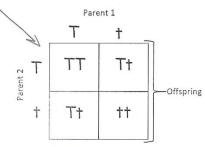# Marking the Text

This is a sample of a student marking the text and writing in the margin to define vocabulary that was unfamiliar. The student also began to organize answers to the questions presented at the end of the article.

Mendel's Accomplishments: Pea Plants
Part B:

Scientists use models to help explain their observations and to predict future outcomes. Mendel needed a system to organize his data from thousands of pea plants. Mendel used math equations to help explain the outcomes of his thousands of pea plant crosses.

In the early 1900s a scientist named Reginald Punnett developed a matrix system to track traits from parents to offspring. Using what Mendel demonstrated with math, Punnett created the following figure:

T = dominant characteristic
t = recessive characteristic

Using this figure, the two genes from each parent are placed on the top and left sides of the matrix and all possible combinations are created inside the square. Punnett showed a dominant trait with an upper case letter, such as T to indicate a dominant trait or characteristic (round, green, or long). A corresponding lower case letter (t) was used to indicate a recessive characteristic (angular, yellow, or short). The resulting offspring shown in the Punnett square can be used to calculate ratios and probabilities of different traits in the offspring.

Together the two genes from a box on the Punnett square form what is known as the genotype. The genotype shows the genes or the internally coded, inheritable information (TT, Tt, or tt). The genotype is the code, but it is not the visible trait. The outward, physical characteristic (round or angular, green or yellow, long or short) of the organism is known as the phenotype. If the genotype is known for an organism's trait, the phenotype can be determined.

If we compare the data from Mendel's investigations with the Punnett square, how do these sources work together? How does the model of the Punnett square explain Mendel's data? How could the Punnett square be used to predict data similar to Mendel's?

(Handwritten margin annotations:)

Genotype
the genes or code for a trait show with letters
Capital = dominant
lowercase = recessive

Phenotype
Outward, physical characteristic
physical → What you see
→ photograph

1. These sources work together by both having the kind of 3 to 1 dominant to recessive
2. The 3 to 1 Ratio