Genetics: The Science of Heredity

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1a In Mendel's cross for stem height, the contrasting traits that the pea plants represented in the P generation were tall stems and short stems.

1b The trait that the plants in the F_1 generation exhibited was that they were all tall. This result is surprising because you would expect some of the offspring to be short like one of the parent plants.

1c The F_2 generation was 75% tall and 25% short, while the F_1 generation was 100% tall. Individual sets of genetic information must control the inheritance of traits in peas. These factors exist in pairs

2a A dominant allele is an allele in which a trait always shows up when the allele is present. A recessive allele is an allele in which a trait is masked whenever a dominant allele is present.

2b If the plant has two dominant alleles for stem height (TT), then it is tall. If the plant has two recessive alleles for stem height (tt), it is short. If the plant is a hybrid (Tt), it is tall.

2c A short pea plant can never be a hybrid for the trait of stem height because a short plant has two recessive alleles (tt); hybrids have two different alleles for a trait (Tt). A hybrid would appear tall because the tall allele is dominant.