# Punnett Pea Predictor

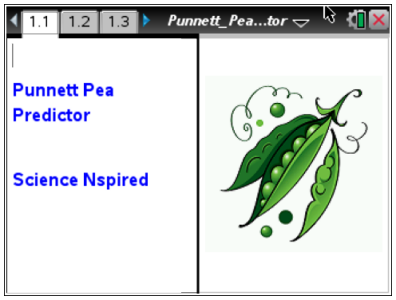
**Student Activity**

**Name** _____

**Class** _____

**Open the TI-Nspire document *Punnett_Pea_Predictor.tns.***

An allele is an alternative form of a gene located at a specific position on a specific chromosome, a DNA molecule. Alleles determine traits that can be passed on from parents to offspring. In many cases, a trait is determined by one pair of alleles—one allele from each parent. Complete dominance occurs when one allele is dominant and the other is recessive.




**Move to pages 1.2 – 1.4.**

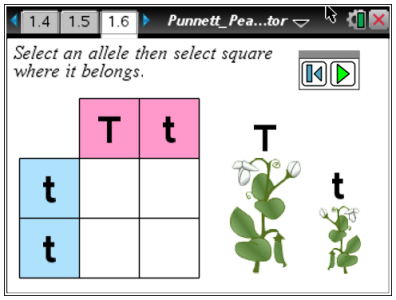
Read the background information for this simulation in the .tns and/or below.

The dominant allele is expressed and the recessive allele is masked. If an organism's **genotype** is homozygous, then the two alleles are the same; two dominant or two recessive. If the genotype is heterozygous, one of each allele is present. An organism's **phenotype** is the trait that is outwardly expressed by the organism.

The example explored here, height in pea plants, is determined by one pair of alleles: tall (T) is dominant and short (t) is recessive. The letters "T" and "t" are used to describe the genotype. The terms "tall" and "short" are used to describe the phenotype.

**Move to pages 1.5 and 1.6.**

2. Read the directions for the simulation on page 1.5. In the simulation on page 1.6, drag pairs of alleles into the correct box of the Punnett square to show the genotypic ratio for the F1 (first) generation. Using the genotypes, you can also determine the phenotypic ratio. Make sure you drag TWO alleles into each box in the Punnett square, since each individual must have two alleles for this trait!




**Tech Tip:** To drag an allele, select T or t, then move to the desired square. Select the square to drop the allele. Select ▶ to check the Punnett square. Then, select ⏮ to clear and obtain a new Punnett square.

**Tech Tip:** Tap or drag an allele, T or t, then move to the desired square. Tap again to drop the allele. Tap play ▶ to check the Punnett square. Then, tap ⏮ to clear and obtain a new Punnett square.

3. Run the simulation several times until you discover the pattern of height inheritance in pea plants. Then answer the questions below. If you need to, return to the simulation.

**Move to pages 1.7 – 1.12. Answer the following questions here or in the .tns file.**

Q1. Two tall parent pea plants will produce tall offspring.

A. always B. sometimes C. never

Q2. Two short parent pea plants will produce short offspring.

A. always B. sometimes C. never

Q3. One parent pea plant is heterozygous for height. In order to have an equal chance of producing tall or short offspring, the other parent pea plant must be _____.

A. heterozygous
B. homozygous (tall)
C. homozygous (short)
D. The genotype of the other parent does not matter. There can never be an equal chance.

Q4. One parent pea plant is homozygous tall. In order to have an equal chance of producing tall or short offspring, the other parent pea plant must be _____.

A. heterozygous
B. homozygous (tall)
C. homozygous (short)
D. The genotype of the other parent does not matter. There can never be an equal chance.

Q5. How many different parent combinations could lead to an equal chance of tall or short offspring?

A. 0
B. 1
C. 2
D. 3

Q6. Explain your response to Question 5.