



Punnett Pea Predictor

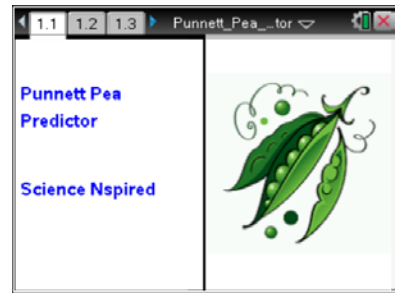
Student Activity

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.



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.

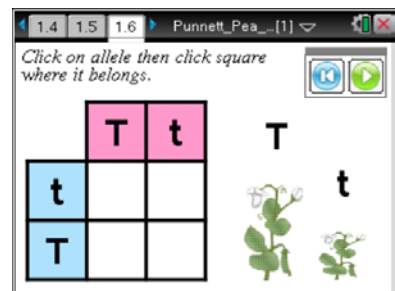
Move to pages 1.2–1.4.

1. Read the introductory information and then move to the Punnett square simulation on page 1.5.

Press **ctrl** and **ctrl** to navigate through the lesson.

Move to page 1.5.

2. In the simulation on page 1.5, 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, click on T or t, then move to the desired square, then click again to drop the allele. Press to check the punnett square. Then, click to clear and get 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 1.6–1.11. 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 C. homozygous (short)
- B. homozygous (tall) 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 C. homozygous (short)
- B. homozygous (tall) 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 C. 2
- B. 1 D. 3
- Q6. Explain your response to Question 5.