

## Concept 10.2

**Mendel discovered that inheritance follows rules of chance.**

### **Mendel's Principle of Segregation:**

Hybrids - the offspring of two different true-breeding varieties.

P = parental generation

F = the hybrid offspring

F = the offspring of the F self-fertilization or the fertilization of each other.

**Monohybrid cross** - a pairing in which the parent plants differ in only one character.

Mendel developed four hypotheses:

1. There are alternative forms of genes.  
**(Alleles)**
2. For each inherited character, an organism has two alleles for the gene controlling that character, one from each parent.

**Homozygous** - the two alleles are the same.

**Heterozygous** - the two alleles are different.

3. **Dominant** - when only one of the two different alleles in a heterozygous individual appears to affect the trait.

**Recessive** - the allele that does not appear to affect the trait in a heterozygous individual.

4. **Mendel's principle of segregation** - the two alleles for a character separate during the formation of gametes, so that each gamete carries only one allele for each character. During fertilization the alleles pair in the offspring.

### **Probability and Punnett Squares:**

Punnett square - a type of diagram that shows all possible outcomes of a genetic cross.

### **Transparency 10 A** Punnett Squares and Monohybrid Cross

Phenotype - an observable trait.

Genotype - the genetic makeup or combination of alleles.

Phenotypic ratio -

Genotypic ratio -

**Testcross** - an individual of unknown genotype, but dominant phenotype, is bred with a homozygous recessive individual. The appearance of the offspring will reveal the genotype of the mystery plant. Because the homozygous recessive parent can only contribute a recessive allele to the offspring.

### **Transparency 10 B Testcross**

#### **Mendel's Principle of Independent Assortment:**

**Dihybrid cross** - crossing organisms differing in two characters.

**Principle of independent assortment** - during gamete formation in an F<sub>2</sub> cross, a particular allele for one character can be paired with either allele of another character.