

**10<sup>th</sup> Grade**  
**Patterns of Inheritance**  
**Assessed Understandings**

1. Traits are expressed if the organism is heterozygous or homozygous for the trait. A recessive trait will only be expressed if the organism is homozygous for the trait. An individual may be a carrier for a recessive gene for a genetic disorder and be asymptomatic.
2. Hereditary/genetic information in chromosomes is contained in molecules of DNA. Genes are sections of DNA that direct synthesis of specific proteins associated with traits in organisms. These consist of various combinations of four different nucleotides that encode this information through their sequence. Mutations in the nucleotide sequence occur and can be inherited by the organism's offspring. Most mutations have no effect on the organism but some may be beneficial or harmful.
3. Punnett squares, including dihybrid crosses, and pedigree charts are used to determine probabilities and patterns of inheritance.
4. The sex chromosomes (X,Y) contain different genes. Each of the sex chromosomes direct the synthesis of specific proteins associated with traits in an organism. Therefore, certain traits will show inheritance based on gender.