Objective

By the end of this lesson, the student will understand the basic principles of Mendelian genetics, including concepts such as dominant and recessive traits, genotype and phenotype, and how traits are inherited through generations. They will be able to perform simple genetic crosses using Punnett squares and predict the outcomes of these crosses.

Materials and Prep

- Paper and pencil for calculations and drawings
- Colored pencils or markers for visual representation
- Access to a computer or tablet for research (optional)
- Basic understanding of cell structure and DNA (review if necessary)
- Familiarity with terms like allele, homozygous, heterozygous, and phenotype (review if necessary)

Activities

- **Punnett Square Practice:** The student will create Punnett squares for different genetic crosses, such as a homozygous dominant plant with a homozygous recessive plant. They will calculate the expected ratios of offspring traits.
- **Trait Exploration:** The student will choose a trait (e.g., flower color, seed shape) and research its dominant and recessive alleles. They will create a visual chart showing the genotypes and phenotypes of the trait.
- **Family Trait Tree:** The student will draw a family tree to track a specific trait (like eye color) through generations. They will identify potential genotypes for family members based on their traits.
- **Genetics Game:** The student will create a simple board game where players draw cards with different traits and use Punnett squares to determine the outcome for their “offspring” based on their chosen traits.

Talking Points

- "Mendelian genetics is all about how traits are passed from parents to offspring. Think of it like a recipe where some ingredients are more important than others!"
- "Dominant traits are like the loudest kids on the playground; they get noticed first! Recessive traits are quieter and only show up when both alleles are recessive."
- "A genotype is like your genetic blueprint, while a phenotype is what you actually see. For example, you might have the genotype for brown eyes but have blue eyes because of other factors!"
- "Punnett squares are like a crystal ball for predicting genetic outcomes. They help us see the possible combinations of alleles from parents."
- "Not all traits follow simple Mendelian genetics. Some traits can be influenced by multiple genes or the environment. It’s like a team effort!"