

*Pre-Lab, Skills, and Standards Alignments*

**MENDELIAN INHERITANCE**

Gregor Mendel is known as the “Father of Genetics.” His proposed principles of heredity—based on his observations in garden plants—formed the basis of our understanding of classical genetics. In this lab, students will learn how to use Punnett squares to predict results of genetic crosses, then randomly select alleles from fictitious “parents” to create unique “offspring” that have a combination of alleles and traits from each parent.

**Lab Length:** 1 hour

**Suggested Pre-Lab Teaching**

- DNA structure, function and heredity
- DNA variation in humans

**Lab Skills**

- Observe and collect data on some common traits within the class.
- Use Punnett squares to predict possible outcomes from genetic crosses.
- Apply Mendel’s laws of heredity to build a fictitious “offspring” based on random selection of allele pairs from “parents.”

**Conceptual Knowledge/Skills (Post Lab)**

- Use the “offspring” result to explain the terms genotype and phenotype.
- Demonstrate how Punnett squares are used to predict outcomes of genetic crosses.
- Explain why offspring have different traits from their parents, and their siblings.
- Describe how Punnett squares can be used in a field like medicine or genetic counseling.

**New York State Science Learning Standards/NGSS**

Science and Engineering Practices	Disciplinary Core Ideas	Cross Cutting Concepts
<p><u>Developing and Using Models</u> Develop and use a model to describe phenomena.</p> <p><u>Analyzing and Interpreting Data</u> Apply concepts of statistics and probability (including mean, median, mode, and variability) to analyze and characterize data, using digital tools when feasible.</p>	<p><u>LS1.B: Growth and Development of Organisms</u> Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. (MS-LS3-2)</p> <p><u>LS3.A: Inheritance of Traits</u> Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited. (MS-LS3-2)</p> <p><u>LS3.B: Variation of Traits</u> In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two</p>	<p><u>Cause and Effect</u> Cause and effect relationships may be used to predict phenomena in natural systems.</p> <p><u>Patterns</u> Patterns can be used to identify cause and effect relationships.</p>



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	alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. (MS-LS3-2)	
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