

## Genetics

## Lesson 4 Understanding Inheritance

Grade Seven Science Content Standard 2.c. Students know an inherited trait can be determined by one or more genes. Also covers: 2.b, 2.d.



## ● Before You Read

Think about a friend's face and, on the lines below, write down the difference between his or her face and your own. Then read the lesson to learn about the inheritance of traits.

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## ● Read to Learn

## Modeling Inheritance

How do plant and animal breeders know how traits will appear in an offspring? The two tools breeders use to identify and predict traits among genetically related individuals are called a Punnett square and a pedigree.

## What is a Punnett square?

If the genotypes of the parents are known, then the different genotypes and phenotypes of the offspring can be predicted. A **Punnett square** is a model used to predict possible genotypes and phenotypes of offspring.

In the first figure at the top of the next page, you will see a Punnett square of the possible offspring of homozygous parents—a true-breeding pea plant for yellow seeds and a true-breeding pea plant for green seeds. *Y* represents the dominant allele for yellow seeds, and *y* represents the recessive allele for green seeds. The Punnett square shows that the only possible genotype for hybrid offspring is heterozygous—*Yy*.

The true-breeding pea plant for yellow seeds only can contribute a *Y* allele, and the true-breeding pea plant for green seeds only can contribute a *y* allele. All of the offspring will have the genotype *Yy*. The phenotype will be one trait, yellow seeds, because *Y* is dominant to *y*.

## MAIN Idea

Interactions among alleles, genes, and the environment determine an organism's traits.

## What You'll Learn

- to interpret a Punnett square and a pedigree
- to distinguish between multiple alleles and polygenic inheritance

## Mark the Text

## Focus on Vocabulary

As you read the text, underline any words that you do not know. Write the word on the left-hand side of your paper and a definition on the right-hand side.

## FOLDABLES

## B Record Information

Make a layered Foldable. As you read the lesson, define, describe, and record what you learn about Punnett squares, patterns of inheritance, and genetic disorders under the tabs.

