

**Guide for  
Reading**

- ◆ What factors control the inheritance of traits in organisms?

Gregor Mendel was curious about the physical characteristics, or **traits**, of pea plants. The passing of traits from parents to offspring is called **heredity**. Mendel's work was the foundation of **genetics**, the scientific study of heredity.

Pea plants are useful for studying heredity because they have many traits that exist in only two forms. They also produce large numbers of offspring, making it easy to collect large amounts of data. Their flower structure makes it easy to set up crosses between specific plants.

Mendel crossed two pea plants that differed in only one trait—height. He crossed purebred tall plants with purebred short plants. These parent plants, the P generation, were **purebred** because they always produced offspring with the same form of the trait. The offspring of this cross, which Mendel called the first filial, for F<sub>1</sub>, generation, were all tall. It seemed as if the shortness trait had disappeared. When the F<sub>1</sub> plants were allowed to cross, about three fourths of the F<sub>2</sub> generation were tall and about one fourth were short. From his results, Mendel reasoned that individual factors, one from each parent, control the inheritance of traits. Today, scientists call the factors that control traits **genes**. The different forms of a gene are called **alleles**.

**Individual alleles control the inheritance of traits. Some alleles are dominant, while other alleles are recessive.** A **dominant allele** is one whose trait always shows up in the organism when the allele is present. A recessive allele is masked, or covered up, whenever the dominant allele is present. A trait controlled by a recessive allele will only show up if the organism inherits two recessive alleles for the trait.

In Mendel's cross, the purebred tall plant has two alleles for tall stems. The purebred short plant has two alleles for short stems. The F<sub>1</sub> plants are all **hybrids**, they have two different alleles for the trait—one allele for tall stems and one for short stems. Geneticists use a capital letter to represent a dominant allele and a lowercase version of the same letter for the recessive allele. Mendel presented his results in 1866. However his work went unnoticed for over 30 years. In 1900, three different scientists rediscovered Mendel's work. Many of the principles that Mendel discovered still stand to this day. Because of his work, Mendel is often called the Father of Genetics.