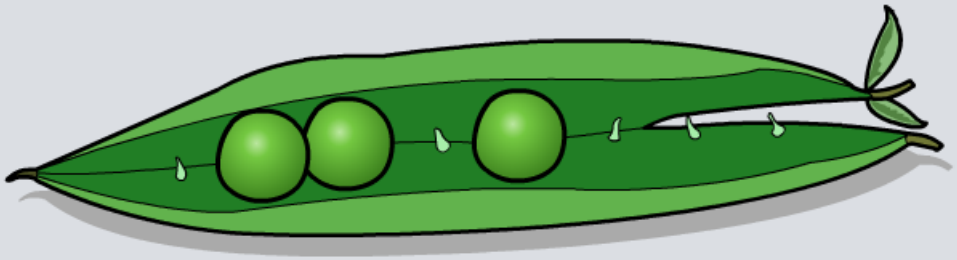
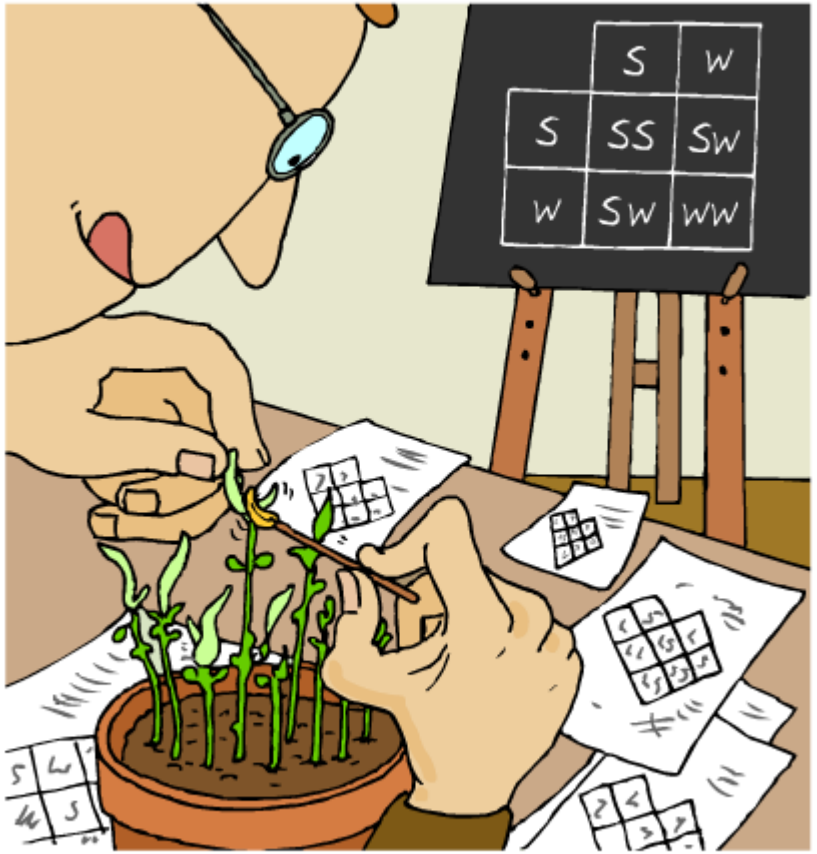
Gregor Mendel



The 'discovery' of modern genetics

Gregor Johann Mendel (1822–1884) was an Austrian monk who closely studied the patterns of inheritance in pea plants.

Click "**start**" to find out more about Mendel, and how his discoveries lead to our understanding of modern genetics.



start

Mendel's experiments

Over seven years, Mendel experimented on more than 28,000 pea plants! Why were his experiments so successful?

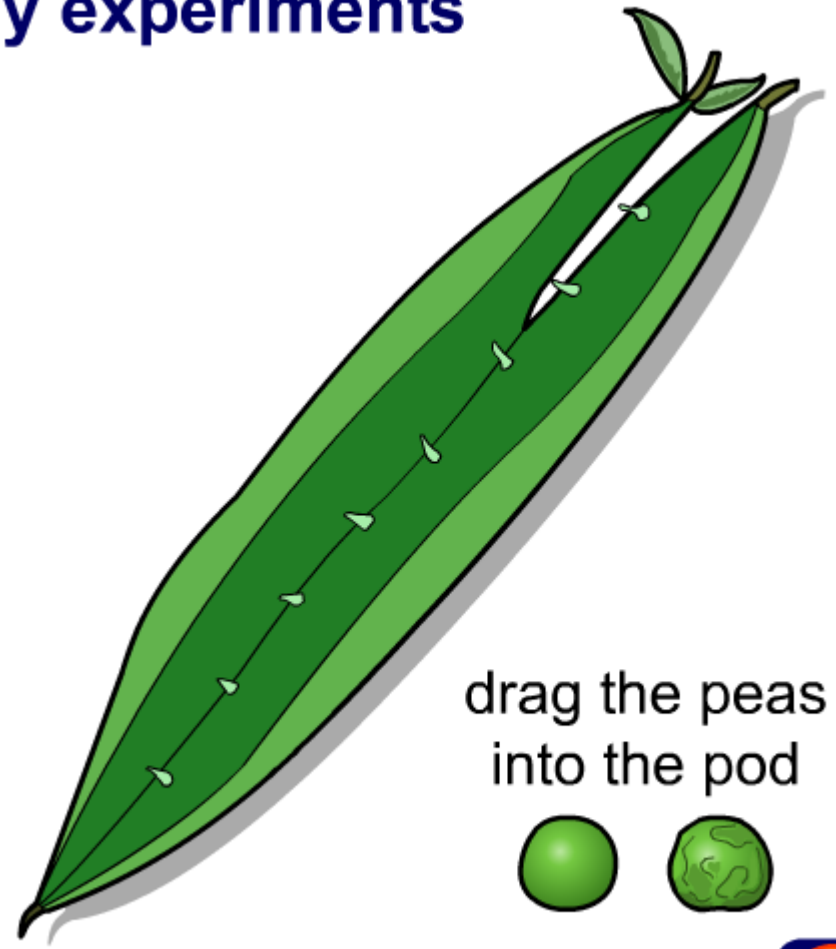
- Pea plants grow quickly.
- Pea plants are available in pure-breeding (**homozygous**) strains.
- Many pea plant characteristics show discontinuous variation; they are either one form or another, with no intermediates. This means that their phenotypes are easily distinguishable.

Mendel's early experiments

Experiment 1: Cross-pollination

First, Mendel cross-pollinated a homozygous (pure-bred) smooth pea plant and a homozygous wrinkly pea plant.

What type of peas were produced by this cross?



drag the peas into the pod

Monohybrid crosses

The type of experiment that Mendel carried out, investigating just a single characteristic, is called a **monohybrid cross**.

There are two alleles controlling pea shape. This means there are **three** possible genotypes that the F2 generation of plants could inherit, leading to **two** possible phenotypes.

	Genotype	Phenotype
homozygous dominant	SS	smooth
homozygous recessive	ww	wrinkly
heterozygous	Sw	smooth

The likelihood of a trait being produced during a monohybrid cross can be mapped out using a **Punnett Square**.

What are Punnett Squares?

What do Punnett Squares show?

Punnett Squares show each of the possible outcomes of a monohybrid cross.

Click "**play**" to find out how Punnett Squares explain the 3:1 ratio of smooth to wrinkly peas.

smooth **x** wrinkly

Mendel's laws of inheritance

After his research, Mendel proposed two laws of inheritance.

Mendel's first law: the law of segregation

- Alternate versions of genes (alleles) cause variation in inherited characteristics.
- An organism inherits two alleles for each characteristic – one from each parent.
- Dominant alleles will always mask recessive alleles.
- The two alleles for each characteristic separate during gamete production.

Mendel's second law: the law of independent assortment

- Genes for different characteristics are sorted independently during gamete production.