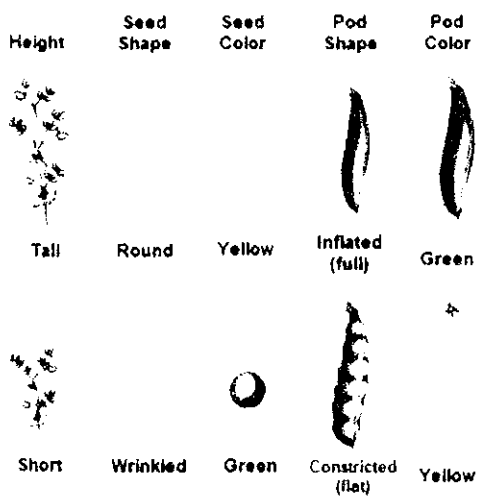


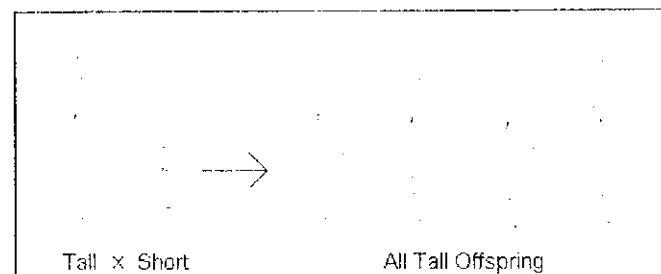
Over 150 years ago, in the 1850s, in a small country called the Czech Republic, there lived a monk named Gregor Mendel. In the monastery where Mendel lived, there was a garden that grew pea plants. Mendel was in charge of tending to this garden and as he did, he noticed that pea plants have many different traits. Traits, as you may know, is any characteristic belonging to an organism or object. Mendel noticed that some pea plants were tall, some were short, some had round yellow seeds, and others wrinkled green seeds. Some pods (where the pea grew) were round and others were flat. He soon became curious about the connection between the color of a pea flower and the type of seed the plant would produce. This curiosity inspired him to experiment with garden peas in 1856.



Each time Mendel studied a trait, he would cross two plants with different expressions of a trait. Crossing is another way to say he bred the two plants so that they would produce offspring. In one experiment he conducted, he crossed a tall pea plant with a short pea plant. He found that the offspring of these two parents were all tall! Since Mendel knew that during reproduction, each parent plant would give one gene for height to its children, he determined that there must be dominant and recessive traits. Dominant traits are those that, when inherited, will cover over, or be more

powerful than, another trait—like the gene for a tall pea plant. Recessive traits are those that, when inherited will be hidden by the stronger trait—like the gene for a short pea plant.

Mendel made careful use of scientific methods, which resulted in the first recorded study of how traits pass from one generation to the next. The study of how traits are inherited is now called genetics. Mendel's work with pea plants is important because he was the first to trace one trait through several generations. He was also the first to use the mathematics of probability to explain heredity. Because of this, Mendel is often called the "Father of Genetics".

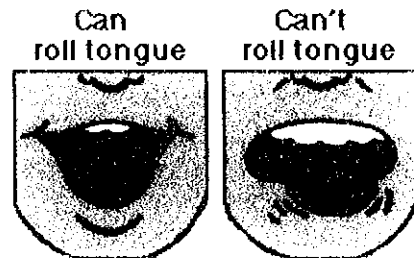


There are dominant and recessive genes

Gregor Mendel is famous for a series of experiments he did on pea plants in which he proved that genes can be recessive or dominant. A dominant gene is one that cannot be covered up. A recessive gene, on the other hand, is a gene that can be hidden by a more dominant version.

You have two alleles for each gene

For each trait you have, you have two alleles, or versions of that trait. This is because you get one version from your mom and one version from your dad. Let's look at the ability to roll your tongue. You can either have a dominant gene for this ability, which would mean that you **can** roll your tongue. Or, you can



have a recessive gene, which would mean that you **cannot**. Scientists use letters to represent whether or not a gene is dominant or recessive. If a gene is dominant it gets a capital letter, for instance "R" for ability to roll your tongue. If a gene is recessive it gets a lower case letter, for instance "r" for not able to roll your tongue. These letters make up the genotypes of an organism.

This means that if you have two dominant genes for tongue rolling ("RR") then you will be able to roll your tongue! But if you have two recessive genes for tongue rolling ("rr") you will not have that ability! What happens, though, if you get a dominant gene ("R") from your dad and a recessive gene ("r") from your mom? Will you be able to roll your tongue???

For any trait you can be homozygous or heterozygous

If you have either two dominant ("RR") or two recessive ("rr") genes, it is easy to know whether or not you will have that ability. An organism like this, with two alleles that are the same, is called homozygous. But an organism that has two different alleles, such as "Rr", is called heterozygous. When an organism is heterozygous the trait that is more dominant will be the one that will show. So if you have both a dominant and recessive trait, "Rr", then you **will** be able to roll your tongue!! The way an organism looks or behaves as a

result of its genotype is called phenotype. So a person with the genes "rr" for tongue rolling will have a phenotype of not being able to roll their tongue. But a person with either the genes "RR" or "Rr" will have a phenotype where they can.

Independent Practice:

1. For each genotype below, indicate whether it is heterozygous (He) or homozygous (Ho).

AA ____ Ee ____ Ii ____ Mm ____
Bb ____ ff ____ Jj ____ nn ____
Cc ____ Gg ____ kk ____ oo ____
DD ____ HH ____ LL ____ Pp ____

2. For each of the **genotypes** below determine what **phenotypes** would be seen.

Purple flowers are dominant to white flowers.

PP _____
Pp _____
pp _____

Bobtails in cats are recessive to long tails.

TT _____
Tt _____
tt _____

Brown eyes are dominant to blue eyes

BB _____
Bb _____
bb _____

Round seeds are dominant to wrinkled seeds

RR _____
Rr _____
rr _____

Class Notes:

Use your reading, "Into to genetics", to fill in the following notes:

- Gregor Mendel performed experiments on _____
- Mendel noticed that pea plants have many different traits. Traits are _____

 - An example of traits can be _____ or _____

- Mendel discovered that crossing two plants with different traits resulted in offspring that looked like one of the parents.

 - Crossing means _____

- Based on Mendel's experiments, he determined that there can be dominant and recessive traits

 - Dominant traits are _____
 - Recessive traits are _____

- Gregor Mendel is so important to the study of genetics, that he is sometimes nicknamed the _____

Class Notes:

- You have _____ alleles, or versions, for each gene
- The genes you have for any trait can be represented by letters. This is called _____

 - Scientists use a _____ letter to show that a gene is dominant.
 - Scientists use a _____ letter to show that a gene is recessive

- If you get both the dominant OR both the recessive gene from your parents, it is called _____ (for example, "RR" or "rr")
- If you get one dominant and one recessive gene from your parents, it is called _____ (for example, "Rr")

 - In this case, the _____ allele will take over and that is the trait you will have.

- The way an organism looks or behaves, regardless of its genotype, is called _____

