

## Laying the Foundation....

### The Work of Gregor Mendel

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**Traits** : characteristics inherited from parents

**Heredity** : the process of passing these traits from parents to offspring ( “inheriting traits”)

**Genetics** : the study of heredity

Two aspects of genetics we’ll focus on :

- the **probability** of inheriting a particular trait
- predicting **patterns** of inheritance in family lines

Mendel was a priest in an Austrian monastery, who also grew and studied heredity using common pea plants.

Why pea plants ?

- widely available in Europe at the time
- easy to grow and matures fast
- easy to control which plants bred together ( pollination using brushes and a knowledge of flower parts )
- studied 7 easily visible traits, each having only two forms ( variations), and they were easy to distinguish

Ex.....

Mendel began his work by first developing true (pure) breeding lines for each of the 7 pea plant traits ( artificial selection ) by cross pollinating plants with the same characteristics over many generations until they only yielded one form of a trait.

- the **blend theory** of the day : information from each parent gets mixed together in the offspring...the offspring show ( “express” ) a mix / blend of both

His first experiment...a “**Monohybrid cross**”...

- bred pure tall plants with pure short plants ( **the P generation** ), expected an **F1 generation** of medium plants....but ALL were tall ! Similar results with the other traits....

Concluded that for traits with two forms (**variations**), one is **dominant**, while the other is **recessive** .

**Dominant** forms of a trait :

- will always be expressed when it is inherited
- found in hybrids ( **heterozygous** individuals)
- also found in creatures that are pure dominant ( **homozygous dominant** )

**Recessive** forms of a trait :

- will be shown only when it is the only form inherited
- the organism is pure recessive (“**homozygous recessive**”)  
for the trait
- in hybrids, remains hidden and unchanged, passed to the next generation

Led Mendel to formulate the first of several genetic “principles”...

The **Principle of Dominance**.....

When individuals with different forms of a trait are crossed, the offspring only show the dominant form of the trait.

Ie...      Ff x Ff will yield offspring showing “F”  
(dominant) and hiding “f”  
(Recessive)

His second experiment :

take 2 of the plants produced during his first test, and breed them together to make another generation of offspring ( F2 Generation )

When two of these F1 hybrids are crossed, the result is the next generation ( F2) showing 3 dominant for every 1 recessive...a “Mendelian Ratio”