



# The Pelayo Family Plays

## Roulette: The Prequel

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**Invertible Vials**  
**Inverts**  
Invertible vials are used to store and transport samples. They are made of clear plastic and have a cap that can be inverted. This allows the sample to be stored in either an upright or inverted position. The cap is made of a special material that allows it to be inverted without breaking. The vials are used in a variety of applications, including the storage of DNA, RNA, and proteins. They are also used in the storage of cell cultures and other biological samples. The casesolutions.com website provides more information on invertible vials and other laboratory equipment.

## Mutations

Any change that occurs in a gene chromosome is called a **mutation**.

Can cause a cell to produce an incorrect protein during protein synthesis.

Causes change in the phenotype of an organism.

Some of the changes brought about by mutations are harmful to an organism. Other mutations, however, are helpful, and still others are neither harmful nor helpful.



Walton Sutton added an important piece of information to the understanding of genetics.

Studied grasshoppers to better understand how sex cells form.

A **sperm** is the male sex cell. An **egg** is the female sex cell.

He noticed and examined the movement of chromosomes during the formation of sex cell.

Sutton hypothesized that chromosomes were the key to understanding how offspring come to have traits similar to those of their parents.

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## Chromosomes and Inheritance

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Sutton found that grasshopper body cells have 24 chromosomes, but sex cells only have 12.

One chromosome in each pair came from the male parent, while other chromosome came from the female parent.

Sutton concluded that the chromosomes carried Mendel's hereditary factors, or genes, from one generation to the next.

This was known as the chromosome theory of inheritance.

According to the chromosome theory of inheritance, genes are carried from parents to their offspring on chromosomes.



# Chromosome

# Inheritance

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# Meiosis

**Meiosis** is the process by which the number of chromosomes is reduced by half to form sex cells--sperm and eggs.

**During meiosis, the chromosome pairs separate and are distributed to two different cells. The resulting sex cells have only half as many chromosomes as the other cells in the organisms.**

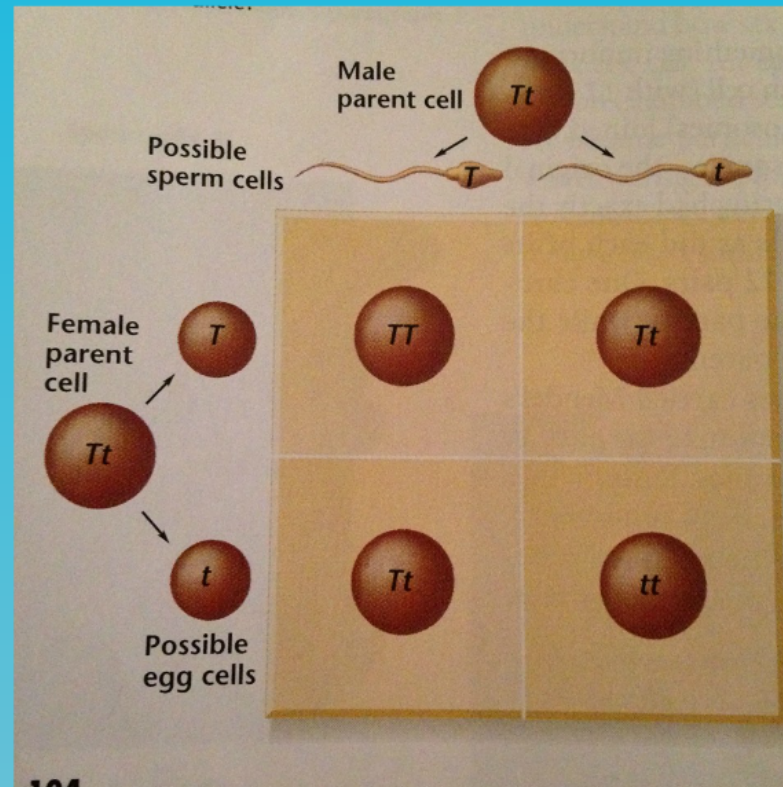
Sex cells end up with half the number found in the parent cell.

Only one chromosome from each chromosome pair ends up in each sex cell.

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# Meiosis and Punnett Squares

Punnett squares are short hand ways to show events in meiosis.



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# Chromosomes

Made up of many genes joined together like beads on a string.

Contain a large number of genes because organisms have so many traits.

In human body cell, you contain 23 pairs of chromosomes, but your cell contains 60,000 genes.

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# The Genetic Code

Main function of genes is to control the production of proteins in the organism's cells.

Proteins help determine the size, shape, and many other traits of an organism.

A single gene on a chromosome may contain anywhere from several hundred to a million or more of the nitrogen bases.

**The order of the nitrogen bases along a gene forms a genetic code that specifies what type of protein will be produced.**

In the genetic code, groups of three bases codes for the attachment of a specific amino acid, which is the building block of proteins.

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# How Cells Make Proteins

Production of proteins is called protein synthesis.

During protein synthesis, the cell uses information from a gene on a chromosome to produce a specific protein.

Takes place in the ribosomes of the cell.

Before protein synthesis can take place, the genetic messenger RNA carry the genetic code from DNA to the Ribosomes.

RNA differs from DNA by:

- RNA looks like a one side, or strand, of a latter
- Contains a different sugar molecule
- Contains adenine, guanine, and cytosine, but instead of thymine, RNA contains uracil

**Messenger RNA** copies that coded message from the DNA to the Ribosomes.

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