

**STD 10-BIOLOGY-FIRST BELL-CLASS-41 Dated 30/12/2020**  
**Chapter – 6**  
**UNRAVELLING GENETIC MYSTERIES**

**Chromosomes in Humans**

- Each species has a definite number of chromosomes.
- There are 46 or 23 pairs of chromosomes in human beings.
- Each parent contributes one **chromosome** to each **pair** so that offspring get half of their **chromosomes** from their mother and half from their father.
- Of these, 44 are **somatic chromosomes** and **two are sex chromosomes**.
- A somatic chromosome pair contains two identical chromosomes.
- Thus in human beings there are 22 pairs of somatic chromosomes.

**Sex chromosomes are of two types.**

- They are called X chromosome and Y chromosome.
  - Females have two X chromosomes
  - Males have one X chromosome and one Y chromosome.
  - **The genetic make up of female is 44 + XX and that of male is 44 + XY.**
- Chromosome number  
46
  - Somatic chromosomes  
44
  - Sex chromosomes  
X and Y

**Genetics of Variation**

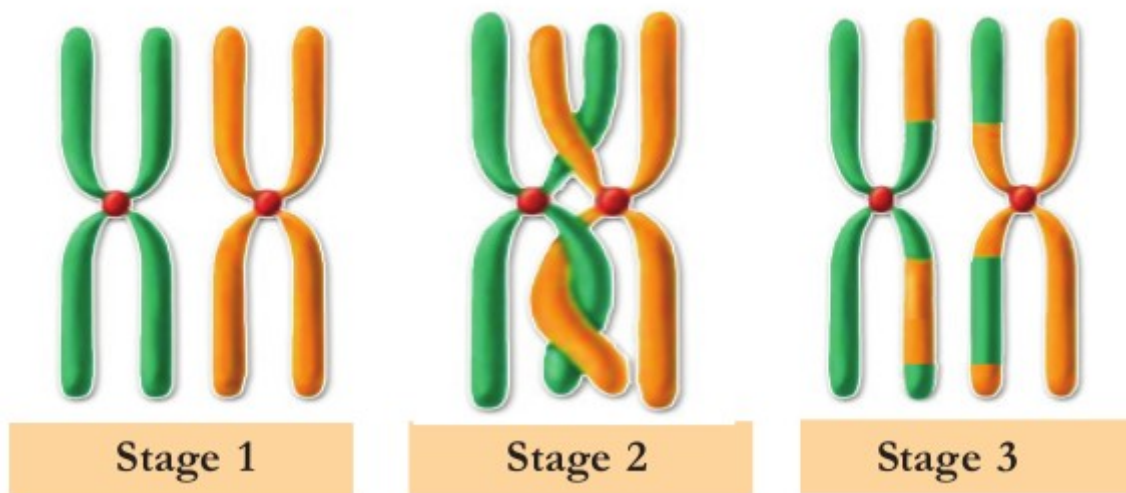
Processes that cause variations are :

1. Crossing over in Chromosomes
2. Combination of Allele during fertilization
3. Mutation

**Crossing over in Chromosomes – A Source of Variation**

- During the initial phase of meiosis, chromosomes pair and exchange their parts.  
**This process is called crossing over of chromosomes.**

- As a result of this, part of a DNA crosses over to become the part of another DNA.
- This causes a difference in the distribution of genes.
- When these chromosomes are transferred to the next generation, it causes the expression of new characters in offspring.



### Combination of Allele during fertilization

- The chromosomes of parents reach the offspring through gametes.
- When gametes undergo fusion, the combination of allele changes.
- This causes the expression of characteristics in offspring that are different from parents. Thus, fertilization causes variations in the next generation.



Example :



- In the above illustration, the characteristics of the offspring is completely different from that of the parents (Parents :Tt xTt, Offspring (tt))
- When gametes undergo fusion, the combination of alleles changes.
- This causes expression of characteristics in offspring that are different from parents.

### Mutation

- A sudden heritable change in the genetic constitution of an organism is called mutation.
- Mutation bring about changes in the genes which can be transmitted over generations and thus leading to variations in characters.

### Causes for Mutation

- Defects in the duplication of DNA,

- Certain chemicals,
- Radiations.
  
- Mutations bring about changes in genes which can be transmitted over generations and thus leading to variations in characters.
- Mutations have great relevance in evolution.

### **EVALUATION**

- 1) Prepare a note based on the processes that cause variation in the new generation.

Prepared by SMITHA K T HST,  
SSHS SHENI