HEREDITY

- The transmission of character/ traits from one generation to next generation is called Heredity.
- Genetics deals with the study of Heredity and variation.

Acquired traits	Inacquired traits
• traits are neither inherited nor transmitted to next gen	• traits that are inherited as well as transmitted to next gen.
• aquired after birth	• taits aquired from parents during reproduct^n
• learning sports	• skin, eye colour

- **Character:** inheritable feature of organism is called a character.
- **Trait:** alternative forms of character is called Traits.

For eg:

Character	Trait
• colour of eye	• Blue or black
• Hair shape	• curly or straight
• Tongue rolling	• no rolling / rolling

- Genes: is a unit of DNA.
- Allele: are a pair of genes that occupy a specific location on a particular chromosome and controls the trait.

Dominant allele ← Allele → Recessive allele

* Homozygous condition: an individual is homozygous for a gene if they inherited the same version of allele. [TT or tt]

* Heterozygous condition: an individual is heterozygous for a gene if they inherit different version of allele. [Tt]

Types के प्रकार

genotype
type of allele

Phenotype
physical appearance

Trait	shape of seeds	colour of seeds	colour of Pod	shape of pod	Plant height	position of flower	colour of flower
Dominant trait	Round	Yellow	Green	Full	Tall	at leaf junction	Purple
Recessive trait	wrinkled	Green	Yellow	Flat, constricted	Short	At tip of branches	white

Mendel uncle

- He proposed law of inheritance in living organism.

Q. Why Mendel chose Peas?

- He chose garden Pea (Pisum sativum) as his experiment material because of:

i] availability of detectable contrasting traits of several characters

ii] short life span of the plant.

iii] Normally allows self-fertilisation but cross fertilisation can also be carried out.

iv] Large no of seeds produced in less time

LAWS

Law of Dominance (monohybrid)

- When an inherited pair of 2 allele is heterozygous, the allele that is called dominant while other is called recessive.

Law of segregation (monohybrid)

- This law states that each trait consists of 2 allele, which segregate during gamete formation. During fertilization, one allele from each parent combines.

Law of Independent assortment (dihybrid)

- Alleles of 2 or more different genes get assorted into gametes independently of ~~of~~ one another.

Monohybrid cross

Parental gen → TT x tt [Homozygous]

gametes → (T) (t)

F1 gen → Tt [Heterozygous tall]

Tt x Tt (selfing)

F2 gen →

♀ \ ♂	T	t
T	TT Tall	Tt Tall
t	Tt Tall	tt short

* phenotype : Tall : short
  3 : 1
* genotype : TT : Tt : tt
  1 : 2 : 1

Dihybrid Cross

Parental generation → RRyy (round, yellow) × rrYY (wrinkled, yellow)

R → round
r → wrinkled
Y → yellow
y → green

gametes → Ry, rY

F1 gen → RrYy [round, yellow]

selfing → RrYy × RrYy

F2 gen →

♀ \ ♂	RY	Ry	rY	ry
RY	RRYY	RRYy	RrYY	RrYy
Ry	RRYy	RRyy	RrYy	Rryy
rY	RrYY	RrYy	rrYY	rrYy
ry	RrYy	Rryy	rrYy	rryy

Round yellow : Round green : wrinkled yellow : wrinkled green
* phenotype : 9 : 3 : 3 : 1

* genotype : 1 : 2 : 2 : 4 : 1 : 2 : 1 : 2 : 1

SEX DETERMINATION

- The process by which the sex of a new born individual is determined is called sex determination.

⇒ Autosomes : 22 pairs

⇒ Allosomes (sex chromosomes) : 1 pair

Factors responsible for sex determination

i) Environment

ii) Genetic

Human sex Determination