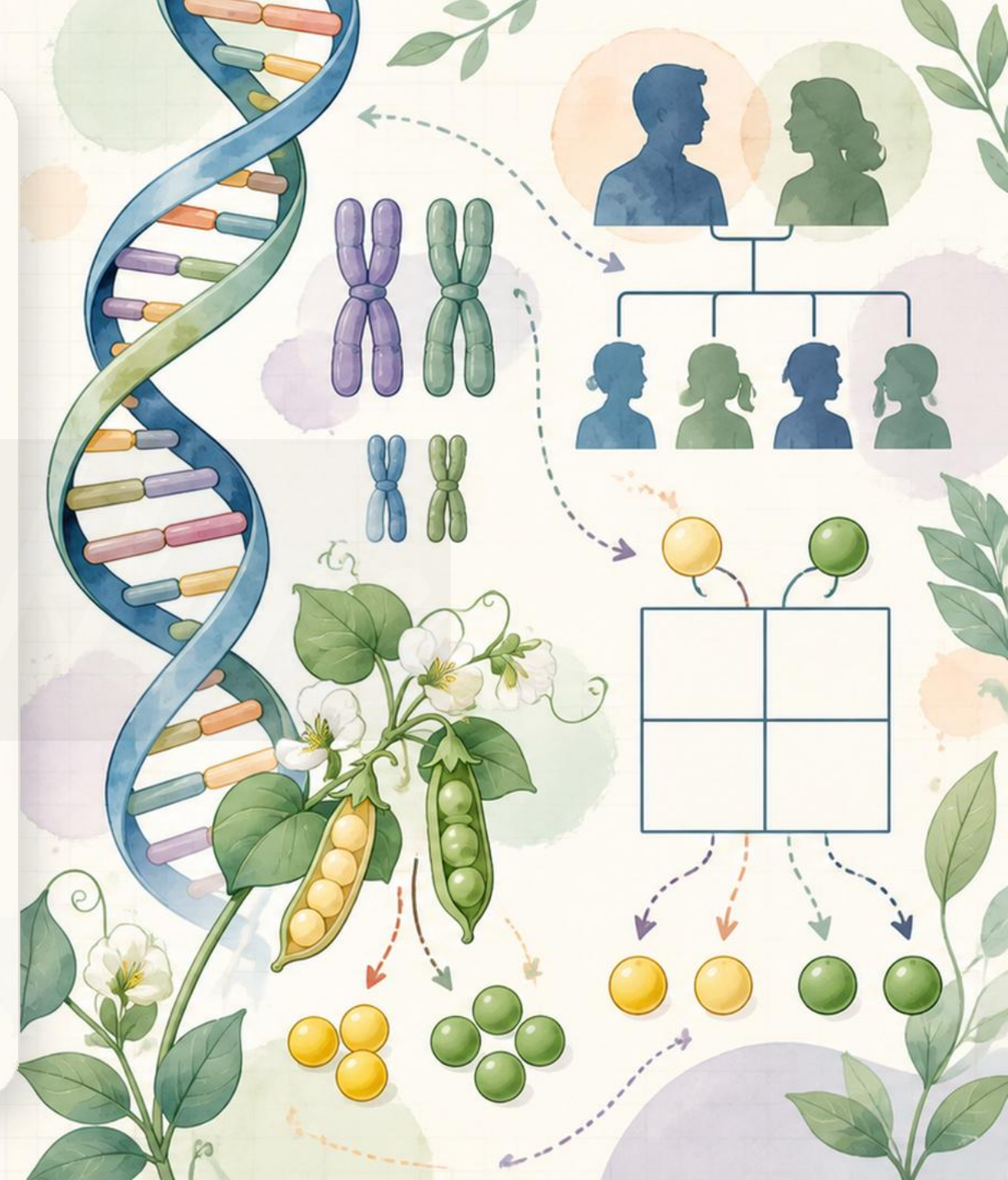


SCIENCE • CLASS 10

CHAPTER 8

Heredity

CHAPTER NOTES



VARIATION, HEREDITY AND SURVIVAL

HEREDITY

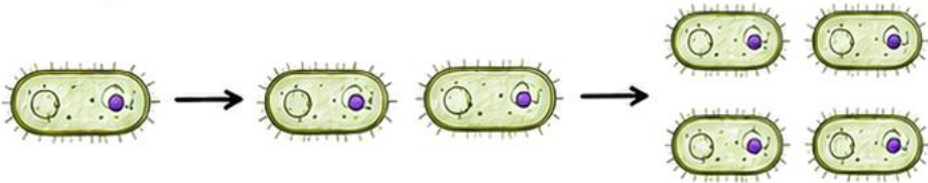
Transmission of genetic information and traits from parents to offspring.

VARIATION

Differences among individuals of the same species.

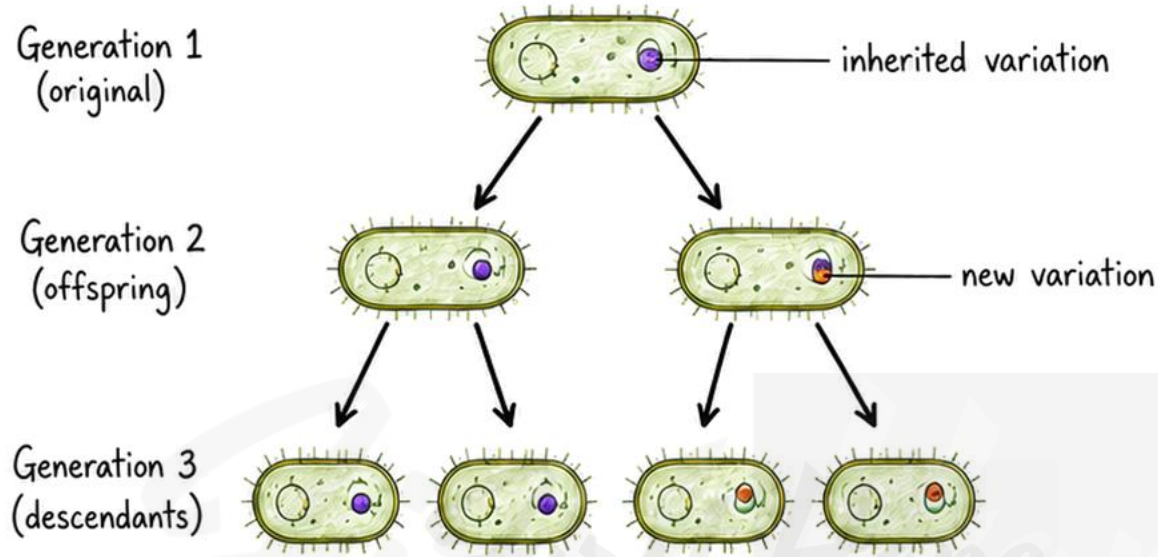
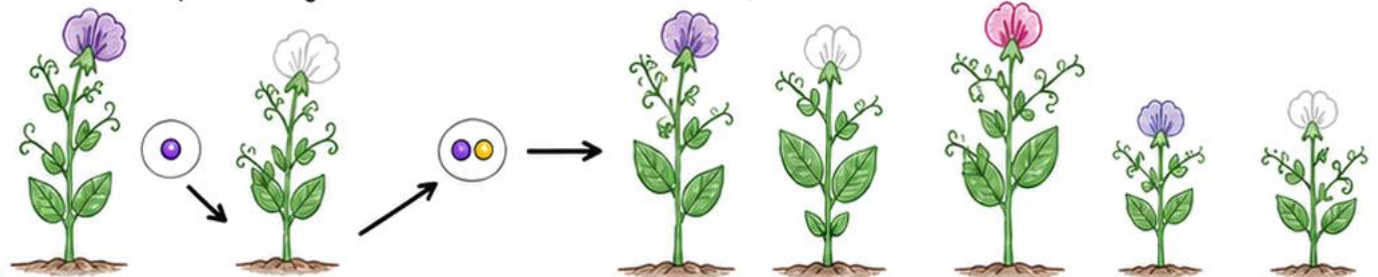
ASEXUAL REPRODUCTION

Usually produces less variation.



SEXUAL REPRODUCTION

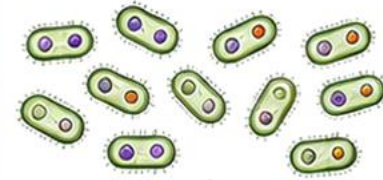
Combines parental genetic material and produces greater diversity.



Variations accumulate over generations.

Small inaccuracies during DNA copying can create new variation.

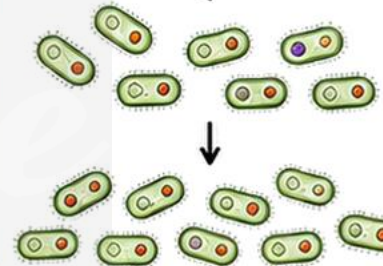
SURVIVAL IN AN ENVIRONMENT



A variation may be helpful, neutral or harmful in a particular environment.



Useful variants are more likely to survive and reproduce.



KEY IDEA: Useful inherited variations improve survival; natural selection over generations contributes to evolution.

MENDEL'S MONOHYBRID CROSS

GREGOR JOHANN MENDEL
(1822–1884)



He studied contrasting traits in garden peas and counted offspring across generations.

ALLELES:

alternative forms of a gene

GENOTYPE:

allele combination

PHENOTYPE:

observable trait

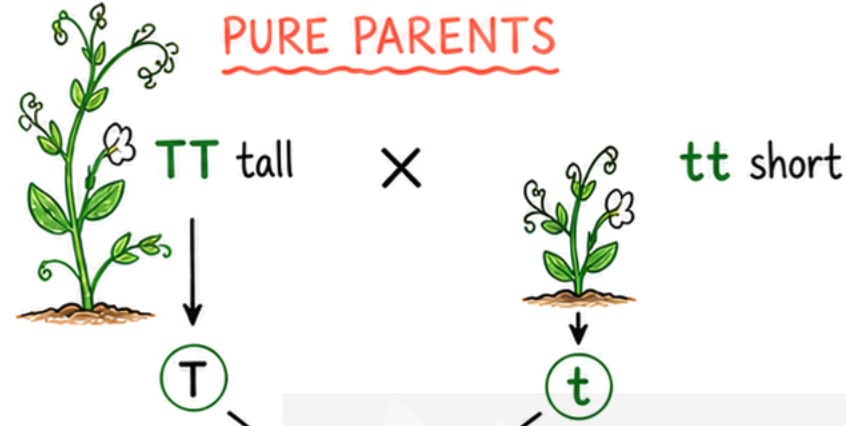
TT and **tt** = homozygous

Tt = heterozygous

T = tall (dominant)

t = short (recessive)

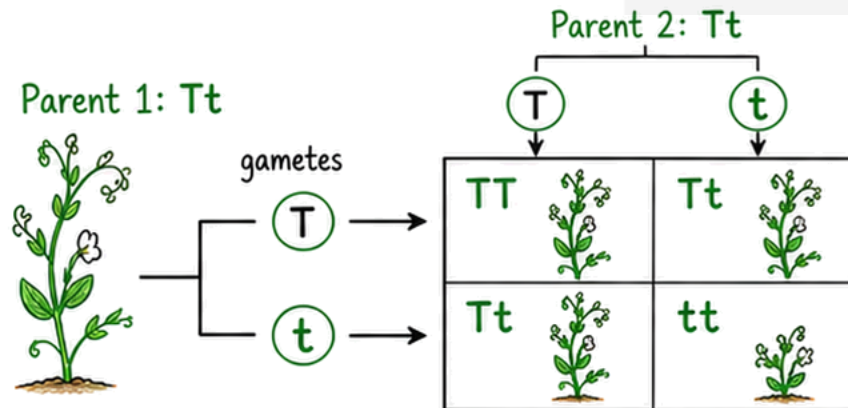
PURE PARENTS



F₁: all Tt tall

No intermediate-height plants.

F₁ SELF-POLLINATION: Tt × Tt



GENOTYPE RATIO:

1 **TT** : 2 **Tt** : 1 **tt**

PHENOTYPE RATIO:

3 tall : 1 short

DOMINANT:

expressed with one
T allele

RECESSIVE:

short appears only
as **tt**

KEY IDEA: Both alleles remain in **F₁**, although only the dominant tall trait is expressed.

DIHYBRID CROSS AND INDEPENDENT ASSORTMENT

P: RRyy round green × rrYY wrinkled yellow



Gametes:
Ry and rY

F₁: RrYy
round yellow



SELF-CROSS:
RrYy × RrYy

ALLELE LEGEND:

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

PHENOTYPE KEY:

-  round yellow (R₋Y₋)
-  round green (R₋yy)
-  wrinkled yellow (rrY₋)
-  wrinkled green (rryy)

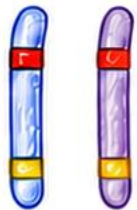
SELF-CROSS: RrYy × RrYy

	R _Y	R _y	r _Y	r _y
♀ R _Y	RRYY	RRYy	RrYY	RrYy
♀ R _y	RRYy	RRyy	RrYy	Rryy
♀ r _Y	RrYY	RrYy	rrYY	rrYy
♀ r _y	RrYy	Rryy	rrYy	rryy

F₂ PHENOTYPES

-  9 round yellow
-  3 round green
-  3 wrinkled yellow
-  1 wrinkled green

Observed: 315 : 108 : 101 : 32 (556 seeds)



Independent
assortment creates
new combinations.

Applies to genes on
different chromosomes,
or far apart on the
same chromosome.

RECOMBINANT PHENOTYPES:



round yellow

and



wrinkled green

KEY IDEA:

Two gene pairs can assort
independently during
gamete formation.



FREE PREVIEW

[Click here to visit our website](#)

SCHOOL NOTES & NCERT SOLUTIONS

Complete notes and
NCERT solutions are
available on
FirstHope app only.



[Scan or click here](#)

Click here to get the app

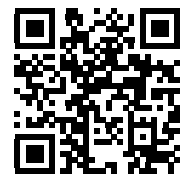


Available on Google Play

JOIN THE FIRSTHOPE COMMUNITY

Join our Telegram channel

Click here to join Telegram



[Scan or click here](#)

@FirstHope_CBSE_Notes

Instagram

@firsthope.school

[Click here to follow >](#)

YouTube channel

@firsthope.school

[Click here to watch >](#)

FirstHope website

firsthope.co.in

[Click here to visit our website >](#)

CBSE / Class 9 / Class 10 / Class 11 / Class 12

Preview notes and NCERT solutions. Full PDFs in the FirstHope app.