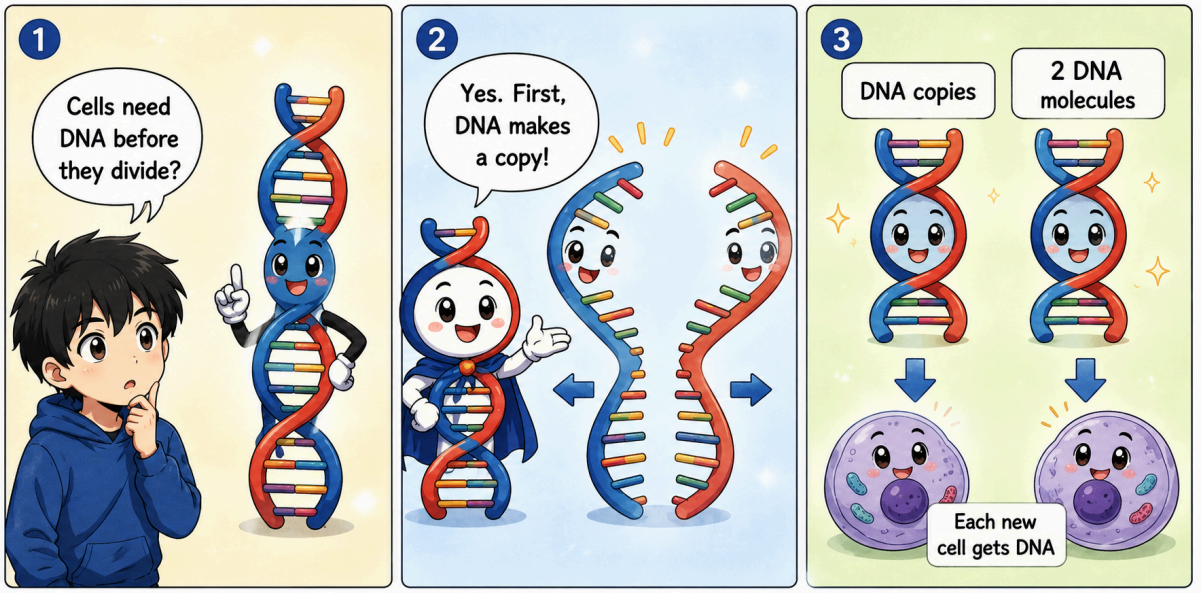
Topic 3.2 DNA, Heredity, and Biodiversity

How is genetic information passed on and shown in living things?

“How Can One DNA Make Two Copies?”



Vocab	What it means
DNA replication	Before a cell divides, DNA must copy itself
Replication	making a copy

Easy explanation

Before a cell divides, DNA must copy itself.

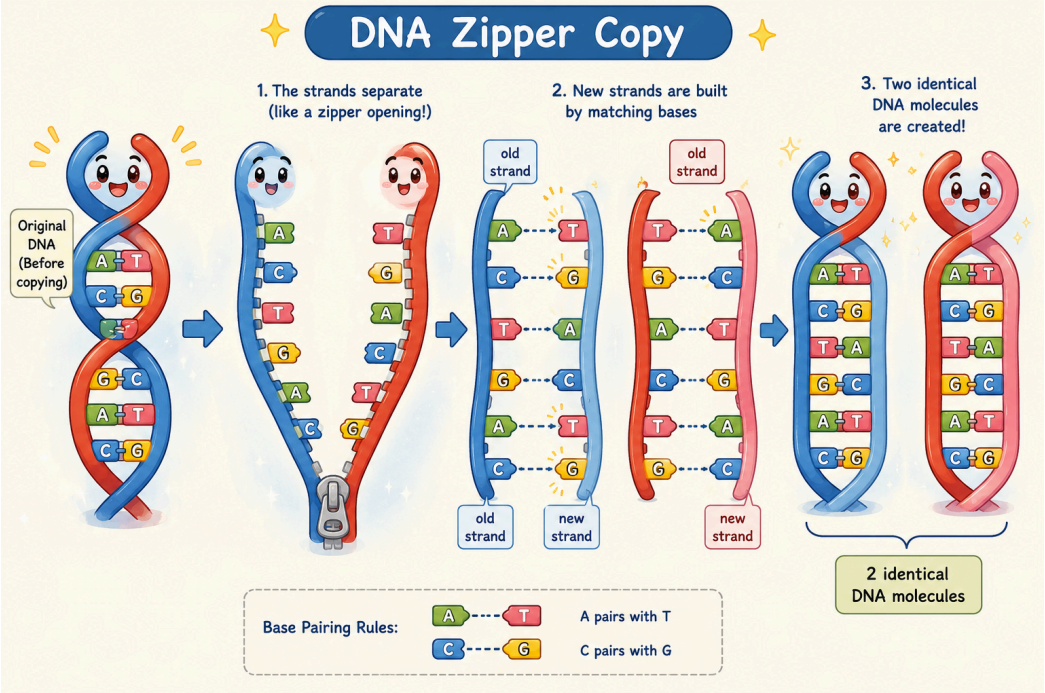
This is called **DNA replication**.

Replication means **making a copy**.

One DNA molecule becomes two DNA molecules.

Each new cell needs DNA instructions.

DNA Replication: The Copying Rule



DNA Zipper Copy			
Original DNA (Before copying)	1. the strands separate (like a zipper opening)	2. New strands are built by matching bases (old line + new line = DNA 1) (old line + new line = DNA 2)	3. Two identical DNA molecules are created! → DNA 1 = DNA 2

Easy explanation

DNA has two strands.

The strands separate.

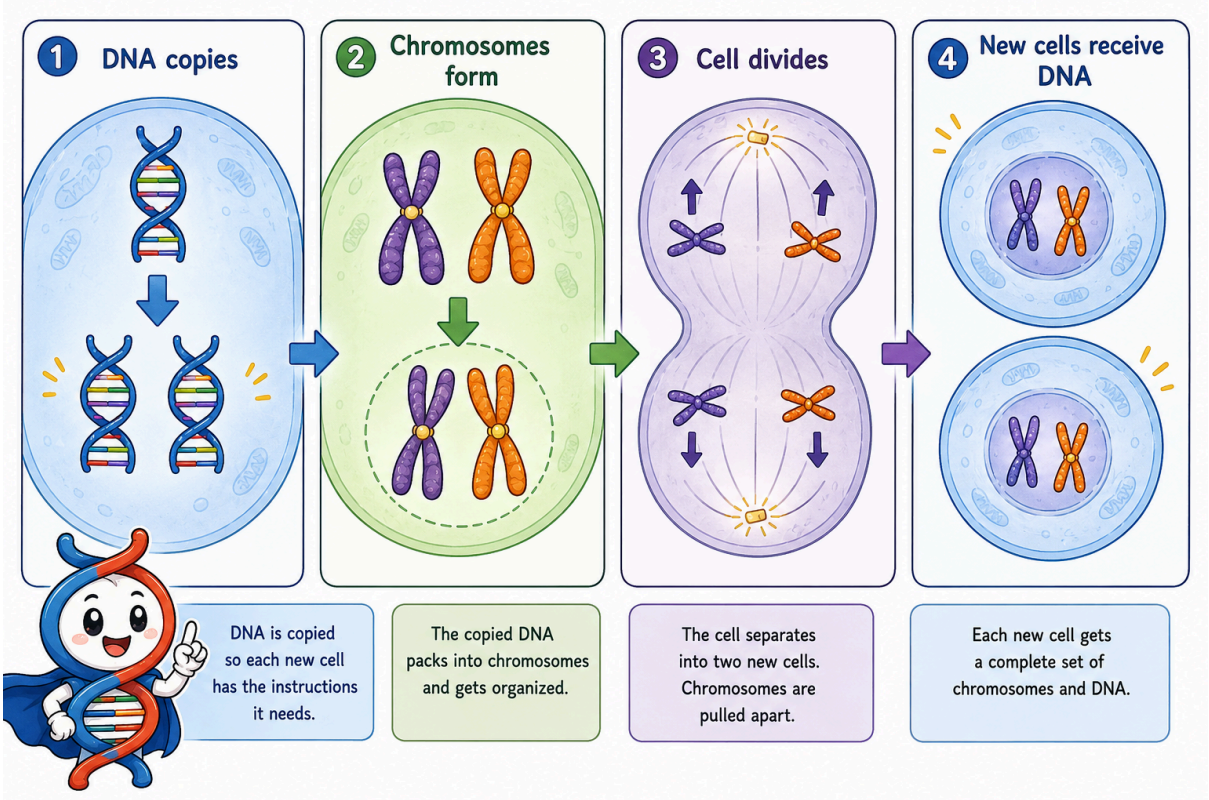
Each old strand becomes a guide.

New bases match the old bases.

A pairs with T.
C pairs with G.

This creates two DNA molecules.

Why DNA Copying Matters



Why DNA copying matters	
1. DNA copies	DNA is copied so each new cell has the instructions it needs
2. Chromosomes form	The copied DNA packs into chromosomes and gets organized
3. Cell divides	The cell separates into two new cells. Chromosome are pulled apart
4. New cells receive DNA	Each new cell gets a complete set of chromosomes and DNA

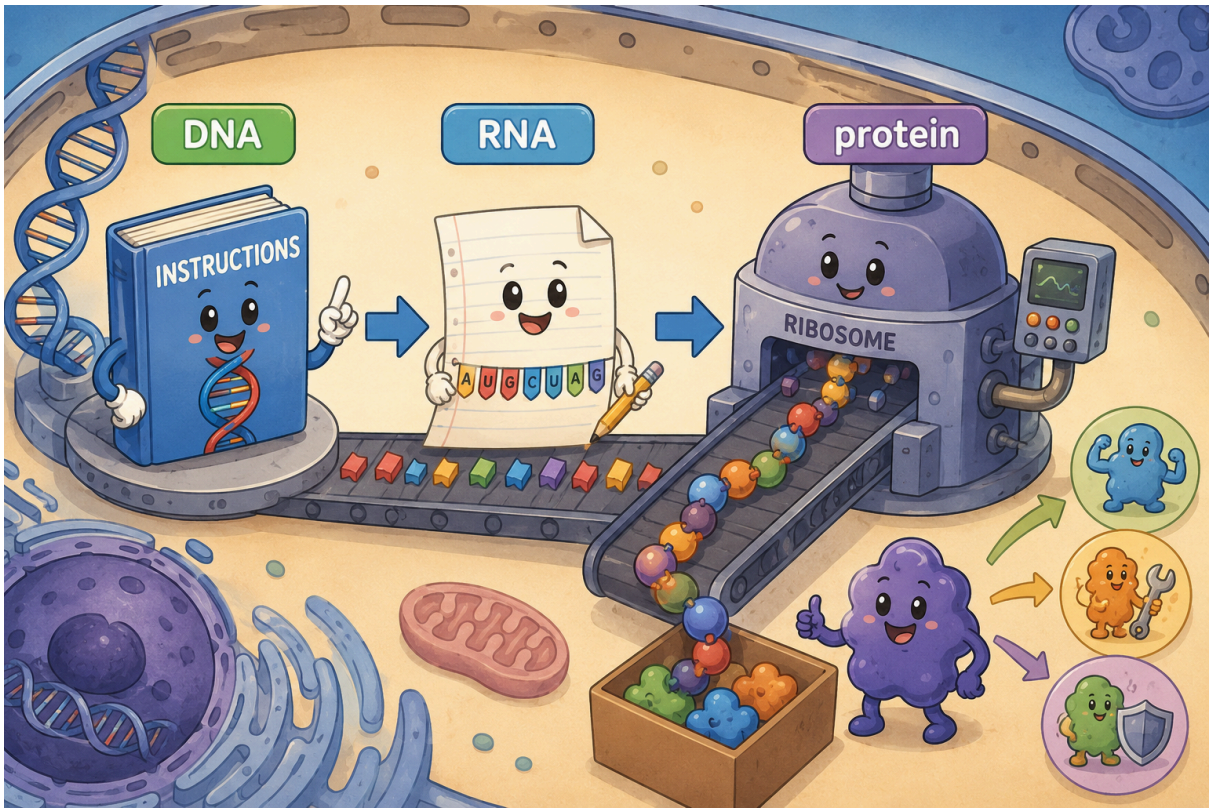
Easy explanation

Each new cell receives DNA.

That is why DNA structure is important.

It helps genetic information pass on correctly.

DNA → RNA → Protein



Easy explanation

DNA stores instructions.

A cell can make an RNA copy of one gene.

The RNA copy helps make a protein.

Proteins help cells work.

Proteins can affect traits.

Key Idea

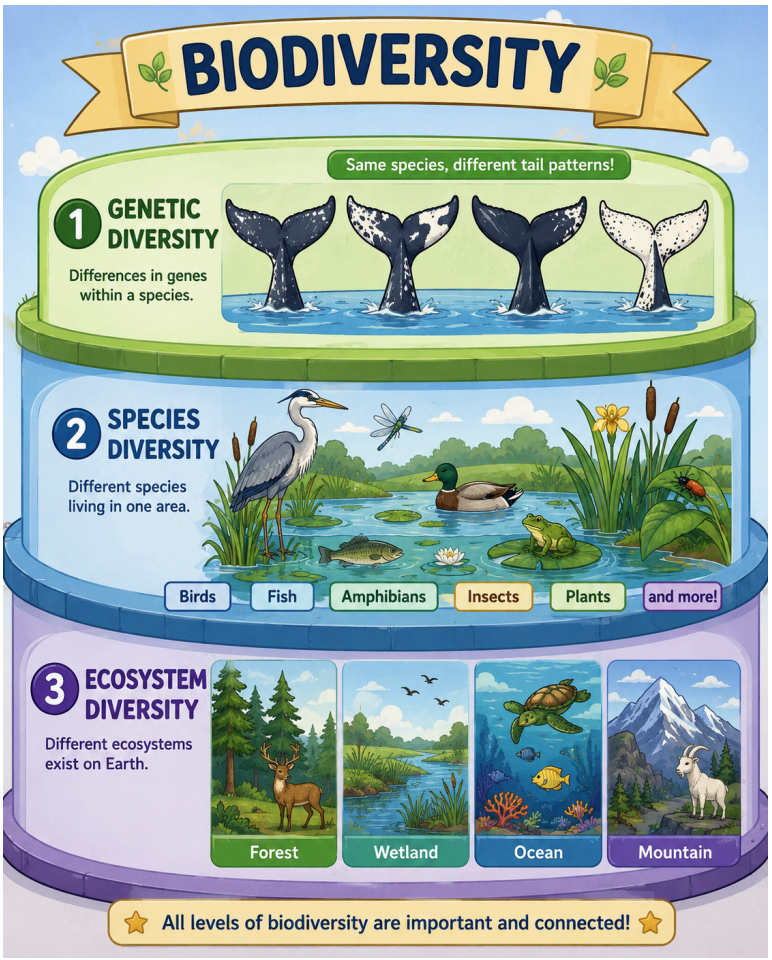
DNA does not directly make traits.

DNA gives instructions.

Cells use the instructions to make proteins.

Proteins help create body features and cell functions.

Biodiversity: “Life Has Many Levels”



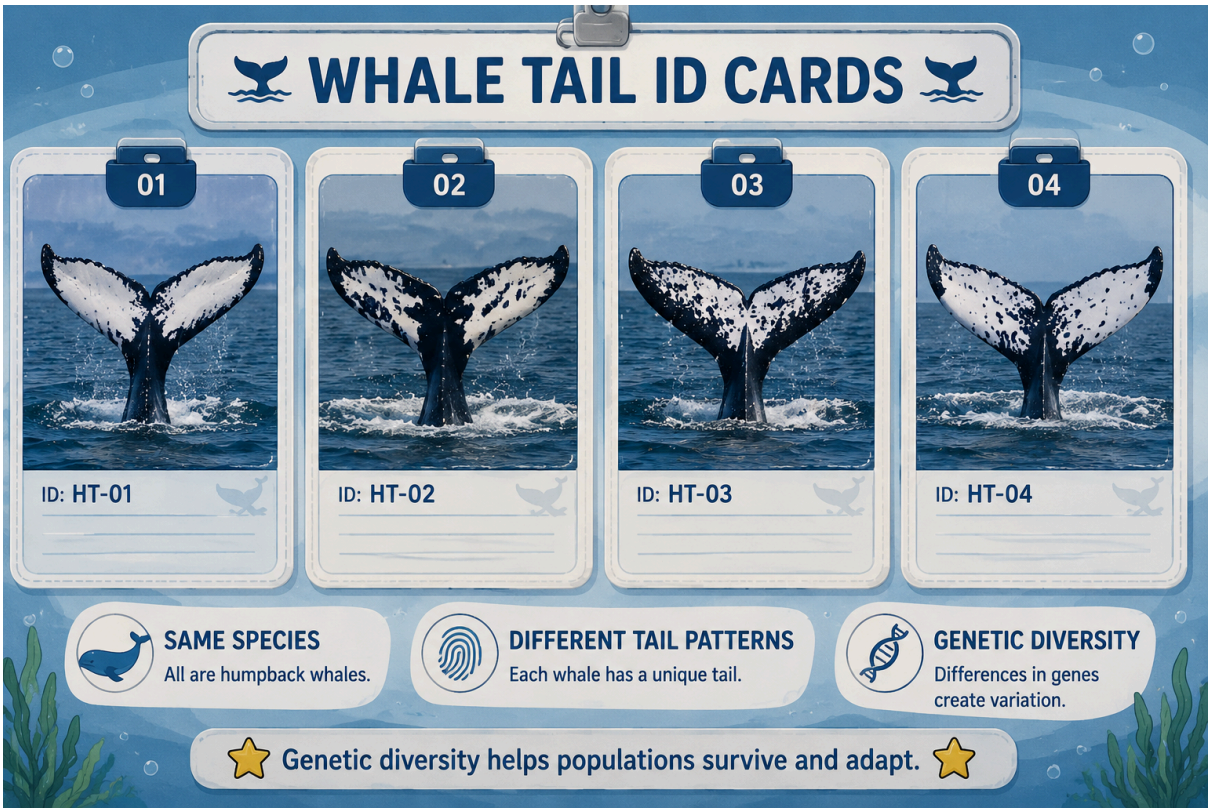
Vocab	What it means
Genetic diversity	differences in genes within a species
Species diversity	different species living in one area
Ecosystem diversity	different ecosystems exist on Earth

Easy explanation

Biodiversity means the variety of life.

It has different levels.

Genetic Diversity



Easy explanation

Members of the same species can still be different.

They may have different inherited traits.

Example:

Humpback whales can have different tail patterns.

This is **genetic diversity**.

Genetic diversity helps **populations survive changes.**

Species Diversity



Easy explanation

Species diversity means many different species live in an area.

A wetland can have:

birds
fish
frogs
plants
insects
bacteria

More species can make an ecosystem stronger.

Ecosystem Diversity



Easy explanation

Ecosystem diversity means Earth has many kinds of ecosystems.

Different ecosystems have different conditions.

Examples:

temperature
water
light
soil
food

Different conditions support different organisms.

“Why Do Children Look Like Parents?”



Vocab	What it means
genetics	study of heredity
heredity	passing traits from parents to offspring
offspring	child or new organism

Easy explanation

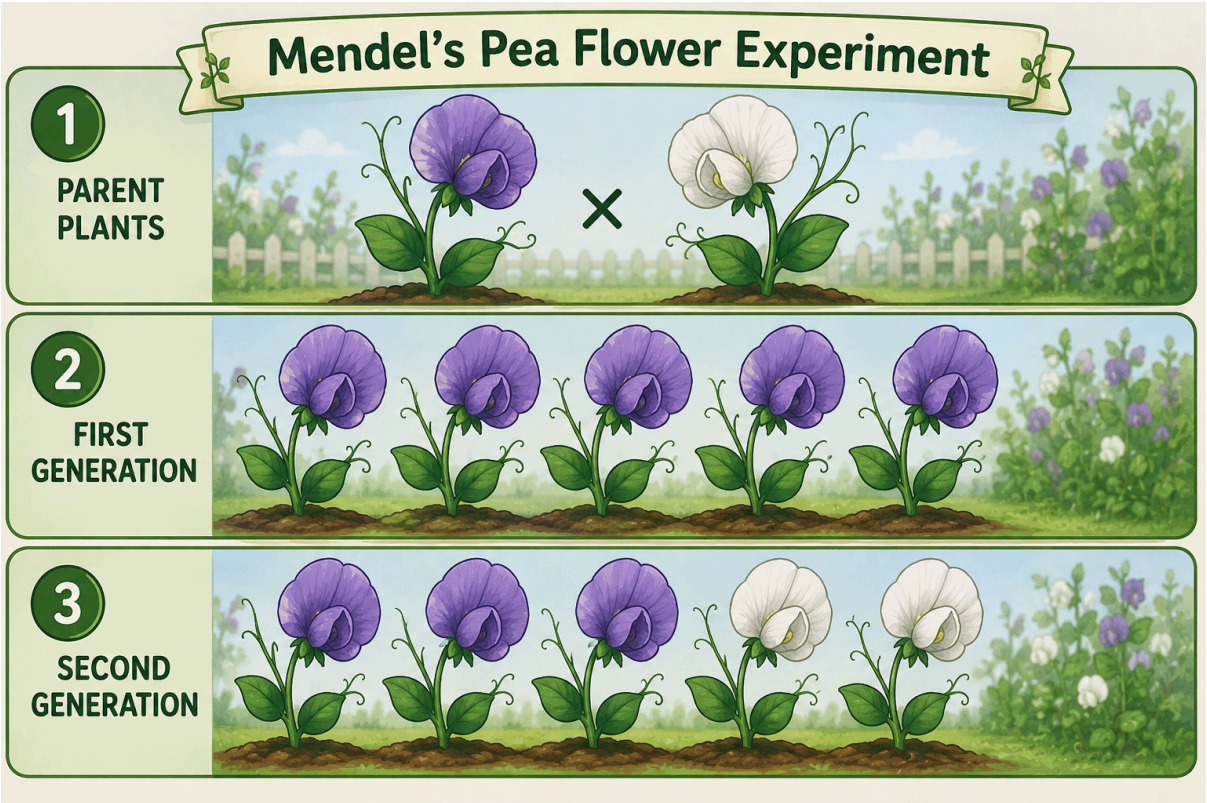
Offspring often look similar to their parents.

This happens because parents pass on genes.

This is called **heredity**.

Heredity means traits pass from parents to offspring.

Mendel and Pea Plants



Easy explanation

Gregor Mendel studied pea plants.

He looked at traits like flower colour.

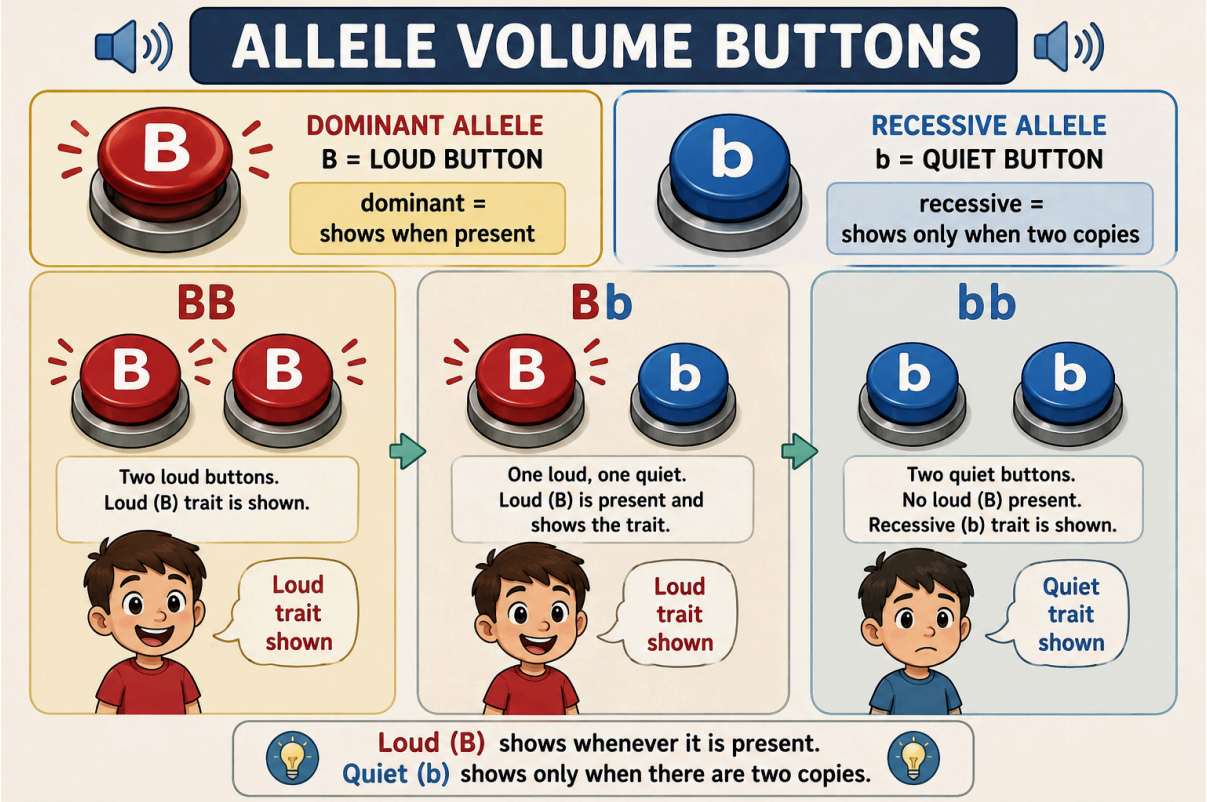
He crossed purple-flowered plants with white-flowered plants.

In the first generation, the flowers were purple.

Later, white flowers appeared again.

This showed that **traits can be hidden and reappear.**

Dominant and Recessive Alleles



Dominant Allele (strong allele) **B = Loud button**		**Recessive Allele** **b = Quiet button**
BB Two loud buttons → Loud trait shown	**Bb** One loud, one quiet → Loud trait shown (B is stronger than b) (**Dominant allele is stronger than recessive allele**)	**bb** Two quiet buttons → Quiet trait shown

Easy explanation

An allele is a version of a gene.

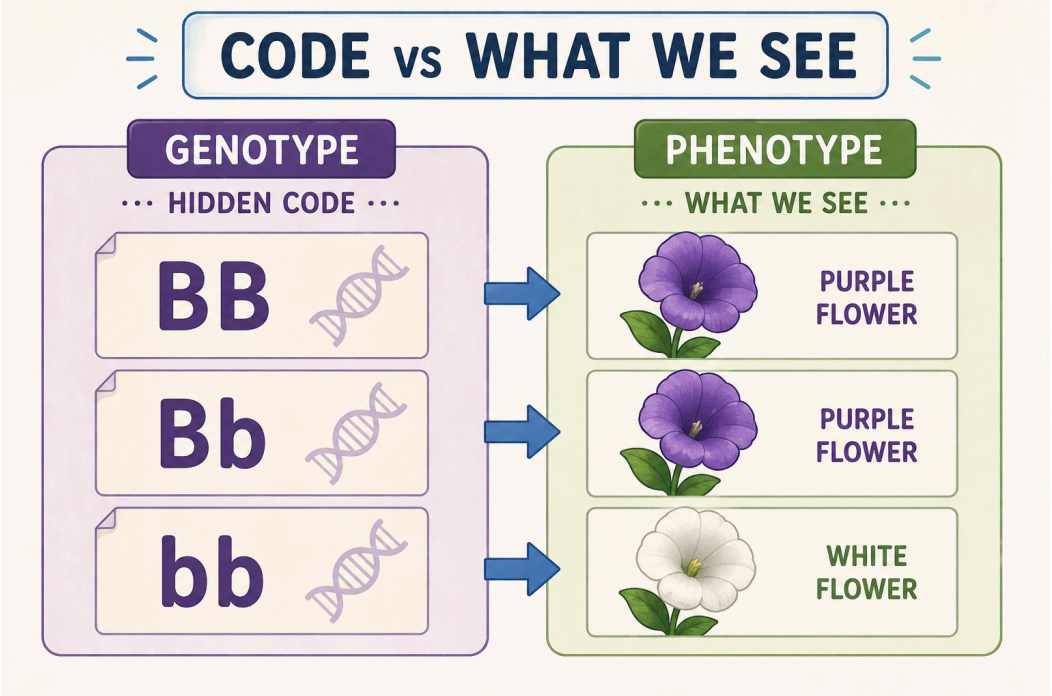
Some alleles are **dominant**.

A dominant allele shows its trait if it is present.

Some alleles are **recessive**.

A recessive trait shows only when there are two recessive alleles.

Genotype and Phenotype



Vocab	What it means
Genotype	the allele combination (alphabet/letters)
Phenotype	the trait we can see (explanation)

Easy explanation

Genotype Examples:

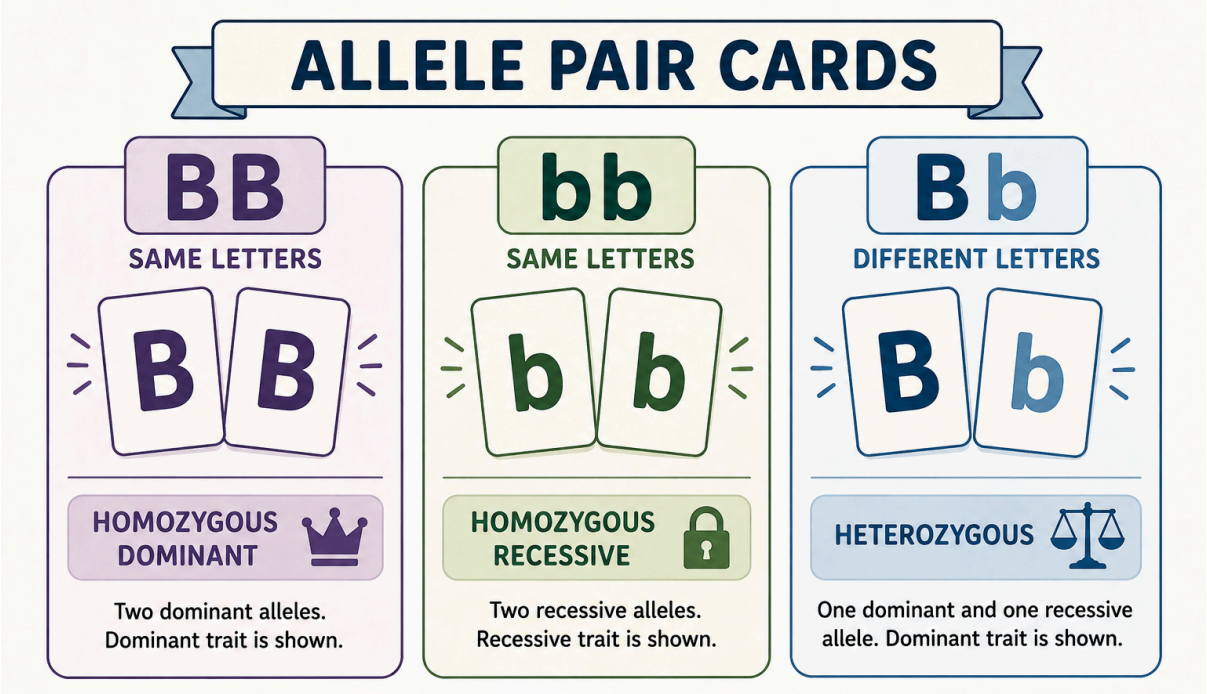
BB
Bb
bb

Phenotype means the trait we can see.

Examples:

purple flower
white flower

Homozygous and Heterozygous



Vocab	What it means
Homozygous	two alleles are the same
Heterozygous	two alleles are different

Easy explanation

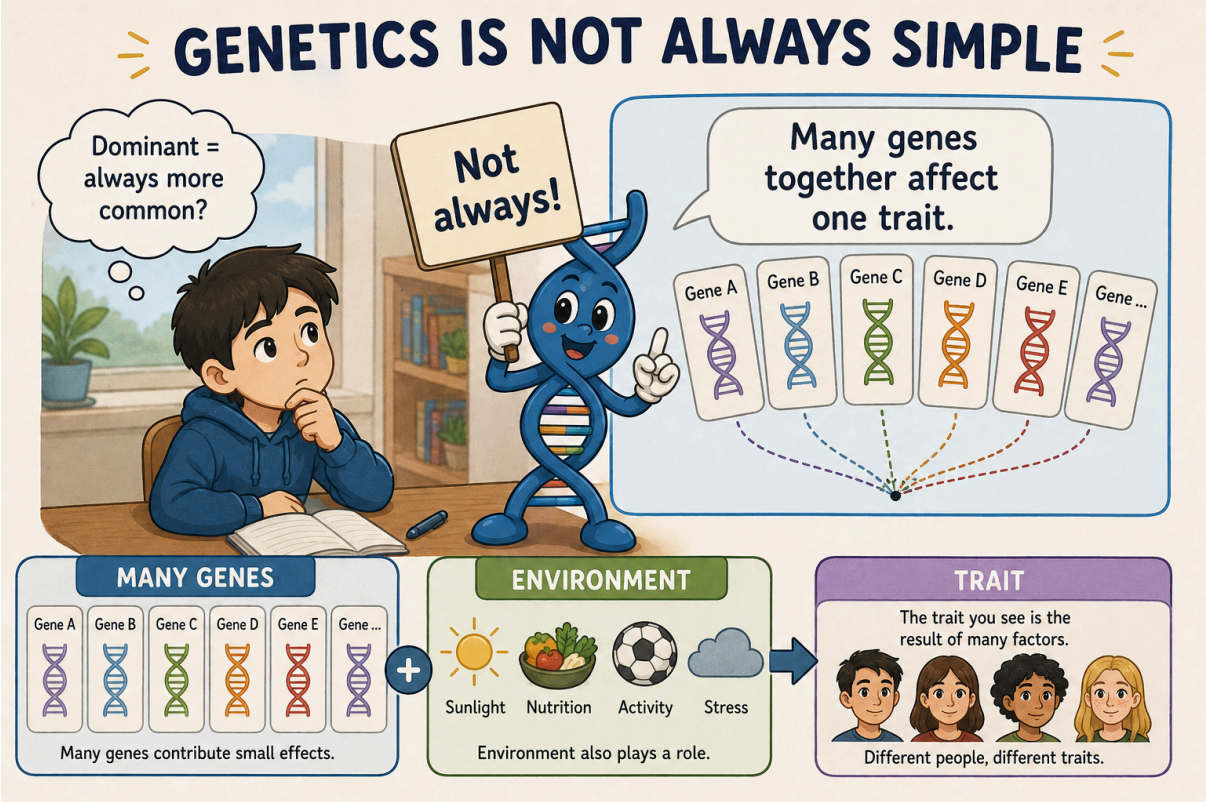
Homozygous means two alleles are the same.

BB is homozygous.
bb is homozygous.

Heterozygous means two alleles are different.

Bb is heterozygous.

Dominant Does Not Mean “Common”



Short explanation

Dominant does not always mean common.

Dominant does not always mean better.

Some traits are controlled by one gene.

But many human traits are controlled by many genes.

Environment can also affect traits.

Summary

Easy explanation

DNA can copy itself.

Genes are sections of DNA.

Parents pass genes to offspring.

Alleles are versions of genes.

Alleles affect traits.

Different traits create variation.

Variation helps create biodiversity.