



# How Sex Cells Get Half the Chromosomes

KS4 BIOLOGY

GENETICS

Ages 13-16 ⌚ 3 min read

## Why Do Sex Cells Need Half?

Your body cells contain **46 chromosomes** — 23 pairs of them. But sex cells (sperm and eggs) contain only **23 chromosomes**. Why? Because when a sperm meets an egg during fertilisation, they combine to make a new cell with a full set of **46 chromosomes**. If sex cells had the full amount, babies would end up with **92 chromosomes** — which would be a disaster!

Think of it like a recipe: each parent contributes half the ingredients, so the finished dish has the right amount. If both parents brought the full recipe, you'd end up with double everything!

## The Special Cell Division: Meiosis

Normal body cells divide through a process called **mitosis**, creating two identical copies. But sex cells divide differently, using a process called **meiosis**. Meiosis is like a carefully choreographed dance that happens in two stages.

First, the cell copies all its **chromosomes**, just like in mitosis. Then something special happens: the cell divides **twice**. The first division separates the pairs of chromosomes, so each new cell gets only one chromosome from each pair. The second division splits these chromosomes apart again. By the end, you have **four sex cells**, each with exactly **23 chromosomes** — half the original amount.

## Shuffling the Genetic Deck

Meiosis is also clever because it mixes up the **genetic material**. Before the first division, chromosomes swap pieces with their partners in a process called **crossing over**. This shuffling is why siblings from the same parents look different — they inherit different combinations of **genes**.

Think of it like shuffling a deck of cards and dealing them out: even though it's the same deck, the hand each player gets is unique!

## Why This Matters

Without meiosis, reproduction wouldn't work properly. This process ensures that every baby is genetically unique (except identical twins) and that **chromosomes** don't keep doubling with each generation. It's one of nature's most elegant solutions to a tricky problem.