Reading and Writing Really Big and Small Numbers

KS3 MATHS NUMBER SYSTEMS Ages 10-14 ⏰ 3 min read

Why Do We Need Special Ways to Write Numbers?

Imagine trying to write the number of grains of sand on a beach, or the distance to the nearest star. The numbers would be so long that your pen would run out of ink before you finished! That's where **scientific notation** and **standard form** come in. They're like a secret code that lets us write enormous or microscopic numbers using fewer digits.

Think of it like a school roster: instead of writing everyone's full name, address, and birthday, you just write their initials and ID number. Much shorter, same information!

Understanding Scientific Notation

Scientific notation is a way of writing numbers as a smaller number multiplied by a power of **10**. For example, **5,000,000** can be written as 5×10^6. The little number (called an **exponent**) tells you how many times to multiply by **10**.

Here's the pattern: the bigger the exponent, the bigger the number. 10^2 equals **100**, 10^3 equals **1,000**, and 10^6 equals **1,000,000**. You move the decimal point to the right the same number of times as the exponent.

Really Tiny Numbers

For numbers smaller than **1**, we use **negative exponents**. Instead of moving the decimal point right, we move it left. For example, **0.00005** becomes 5×10^{-5}. A single atom is roughly 10^{-10} metres wide—that's impossibly tiny!

Think of it like zooming in on a photograph: each time you zoom in, the number gets smaller. Negative exponents are like zooming into smaller and smaller things.

Real-World Examples

The distance to the Sun is roughly **150,000,000** kilometres, which we write as 1.5×10^8 km. A virus might be **0.0001** millimetres, written as 1×10^{-4} mm. Scientists use this system every day because it makes calculations easier and mistakes less likely.

Once you understand the pattern, reading and writing big and small numbers becomes much simpler than it looks. You're really just counting how many places the decimal point moves!