SKILL #06

CODE: SN.1

Scientific Notation and Standard Form

Core Concept

Scientific Notation is a shortcut for writing very big or very small numbers using powers of 10. It helps scientists, engineers, and students like you work with space-sized numbers 🚀 or microscopic ones 🔬 without all the zeros!

THE GOLDEN RULE

Scientific notation makes huge and tiny numbers manageable!

Format: $a \times 10^n$ where $1 \leq a < 10$ and n is an integer

To Write in Scientific Notation:

1. Move the decimal so there is one nonzero digit to the left.
2. Count the number of places moved:
    - If you moved left, n is positive.
    - If you moved right, n is negative.
3. Write as $a \times 10^n$

To Write in Standard Notation:

1. Move the decimal point n places.
    - Right if n positive
    - Left if n negative

Why We Need It:

- Huge numbers: Distance to stars, world population.
- Tiny numbers: Size of atoms, computer memory
- Easier calculations
- Scientific communication: Universal format for scientists

Examples

Standard to Scientific Notation:

- 4,500 = 4.5×10^3
- 0.000012 = 1.2×10^{-5}
- 170,500,000 = 1.705×10^8

Scientific Notation to Standard form:

- $1.5 \times 10^{-6} = 0.0000015$
- $9.6 \times 10^4 = 96{,}000$

Common Mistakes to Avoid

❌ Moving the decimal the wrong way

❌ Forgetting to keep only one nonzero digit to the left of the decimal.

❌ Using the wrong sign for the exponent.

❌ Not counting the decimal places correctly.

Real-Life Connection

🚀 Astronomy & Space
- Speed of light: 3×10^8 m/s

🔬 Biology & Medicine
- Human cells: 3.7×10^{13}

💻 Technology & Computing
- Smartphone pixels: 2×10^6 pixels

🌎 Earth & Environment
- World population: 8×10^9 people

Resource Links



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