

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:

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

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.

🔗 Additional Resources



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