

Essential Question

How do scientists write very large and very small numbers?

Why Scientific Notation?

- Science numbers can be huge or tiny
- Long strings of zeros are easy to miscount
- Scientific notation keeps them short

Measurements in science can be enormous or incredibly small.

Parts of Scientific Notation

- Coefficient: at least 1, less than 10
- Base: always 10
- Exponent: how far the decimal moved

Every number in scientific notation has three parts.

Large Numbers

- Move the decimal left
- Stop when one nonzero digit is in front
- Count the moves: positive exponent

To write a large number in scientific notation, start at the decimal point, which sits at the end of a whole number.

Small Numbers

- Move the decimal right
- Stop just after the first nonzero digit
- Count the moves: negative exponent

For a number smaller than 1, move the decimal point to the right until it sits just after the first nonzero digit.

Back to Standard Notation

- Positive exponent: move right
- Negative exponent: move left
- Fill empty places with zeros

To change scientific notation back into a regular number, undo the moves.

Example: Speed of Light

Try it first!

Light travels about 300,000,000 m/s. Write this speed in scientific notation.

Diagram: A yellow sun with an arrow labeled 300,000,000 meters per second, speed of light.

Example: Red Blood Cell

Try it first!

A red blood cell is about 0.0000075 m wide. Write this width in scientific notation.

Diagram: A red blood cell drawn as a red disk with a lighter center. A double arrow across it is labeled 0.0000075 meters.

Example: Back to Standard Notation

Try it first!

A grain of sand has a mass of 4.06×10^{-4} g. Write this mass in standard notation.

Diagram: A card reading 4.06 times 10 to the negative 4th grams with an arrow pointing to a card reading question mark grams.

Big Ideas

- Coefficient: 1 to less than 10
- Big numbers: positive exponent
- Small numbers: negative exponent
- Exponent = decimal moves