

Scientific Notation

Mini Lesson

Unit 1 Physics Essentials

How can we write numbers?

Is 0.000000000000000008 easy to read?

Is 3000000000 easy to read?

We can write these numbers in an easier way to understand!

Scientific Notation

- A method of expressing very large or very small quantities as powers of 10.
- Why do we use it?
 - Easily able to express very large or very small quantities.
 - Mass of an electron:
 - 0.00000000000000000000000000000000911 kg
 - Orrrr... 9.11×10^{-31}

Converting between decimals and scientific notation

- General expression:

$$\#.\#\# \times 10^\#$$

- Number in front is ALWAYS greater than 1 and less than 10
- Always x 10
- Exponent can be negative or positive

Numbers to Scientific Notation

Numbers into Scientific Notation

0.0043

The Number is a decimal **less than 1**,
so the **Exponent will be Negative**.

= 0.0043
3 places

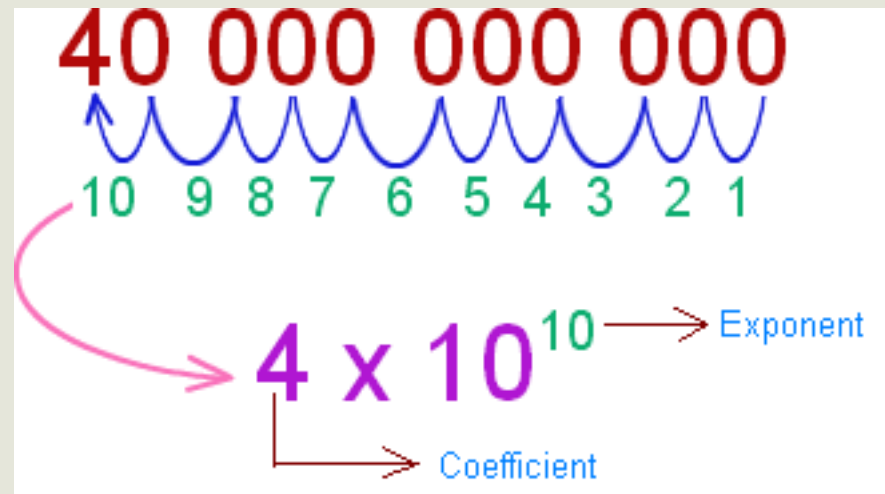
Move the Decimal point to the **RIGHT**
to create a number between 1 and 10.

= ~~0~~~~0~~~~0~~4.3

Remove Zeroes that are not needed.

= 4.3×10^{-3} ✓

We moved **3 places** so
Power of 10 is three : 10^{-3}




is less than 1 = move RIGHT = Negative exp
is Greater than 1 = move LEFT = Pos exp

From Scientific Notation to Standard

$$2 \times 10^9$$

2 . 0 0 0 0 0 0 0 0 0 0




1 2 3 4 5 6 7 8 9

2,000,000,000

$$2 \times 10^{-9}$$

0 0 0 0 0 0 0 0 0 2 .



9 8 7 6 5 4 3 2 1

0.000000002

Positive Exponent : Move RIGHT

Negative Exponent: Move LEFT

Practice with Scientific Notation

- 600,000,000
- 7.99×10^7
- 9,000,000,000
- .000 008 21
- 4×10^{-6}