Scientific Notation

Scientists often work with very large and very small numbers, however these can be <mark>difficult</mark> to work with. To simplify matters we write these numbers using <mark>exponents</mark> or <mark>scientific notation</mark>.

In scientific notation, the numerical part of the measurement is a number from 1 to (and including) 9 multiplied by a whole-number power of 10.

For example: 6×10^3
The number 6 is between 1 and 10 and is followed by a whole number power of 10 (10^3).
6×10^3 is **6000**.

To use scientific notation:
1. Move the decimal to the left or right until it is behind the first digit
2. Write the new number x 10
3. Count the number of spaces you moved the decimal. This is the exponent (power) of 10.
4. Look at the direction you moved your decimal:
    Left = positive exponent (e.g. 10^4)
    Right = negative exponent (e.g. 10^{-4})
5. Write the proper value of the exponent by the 10.

Examples
1. <mark>**Large numbers**</mark> - 36000 written in scientific notation is <mark>3.6×10^4</mark>. Count the number of decimal places you move to the left and this becomes the exponent.

2. <mark>**Small numbers**</mark> - 0.00015 written in scientific notation is <mark>1.5×10^{-4}</mark> Notice that a negative exponent is used when moving the decimal to the right.

<u>To change from scientific notation to standard form</u>:

1. Move the decimal to the <mark>right</mark> for a positive exponent of 10.

2. Move the decimal to the <mark>left</mark> for a negative exponent of 10.

3. Write the value in standard form.

<u>Examples</u>

1. Positive exponents - 7.044×10^2 - move the decimal to the right two places to become 704.4

2. Negative exponents - 1.28×10^{-5} – move the decimal to the left 5 places to become 0.0000128