

## Scientific Notation

### Converting to Scientific Notation

**Step 1:** Place the decimal immediately to the right of the left-most non-zero number, resulting in a decimal number with a single digit to the left of the decimal point. *This should give you a number between one and ten.*

***Example:*** *Starting number = 3750 → 3.750*

**Step 2:** Count the number of digits between the old and the new decimal point, this gives the power,  $n$ , of 10 ( $10^n$ ).

***Example:*** *There are 3 digits (750) →  $n = 3$  → "x  $10^3$ "*

**Step 3:** If the decimal is shifted to the left, the exponent is positive. If the decimal is shifted to the right, the exponent is negative.

***Example (Final Answer):*** *The exponent is positive, and the final answer is  $3.750 \times 10^3$*

### Converting Scientific Notation to Integers

**Step 1:** Write the decimal number.

***Example:***  *$3.750 \times 10^3 \rightarrow 3.750$*

**Step 2:** Move the decimal the number of places specified by the power of ten: to the right if positive and to the left if negative. Add zeros if necessary.

***Example:***  *$3.750 \rightarrow 3750$  because " $10^3$ " tells you to move the decimal three places to the right.*

**Step 3:** Rewrite the number in integer form.

***Example (Final Answer):*** *3750*

## Multiplying & Scientific Notation (Without a Calculator)

Multiply the main numbers and add the exponents

Model:  $(2 \times 10^4) \times (6 \times 10^3) = 12 \times 10^7 = 1.2 \times 10^8$

Visual taken from <http://quark.physics.uwo.ca/~harwood/phys0/sci%20notation%20drill.html>

## Division and Scientific Notation (Without a Calculator)

Divide the main numbers and subtract the exponents

Model:  $(12 \times 10^8) \div (6 \times 10^3) = 2 \times (10^8 \times 10^{-3}) = 2 \times 10^5 = 200,000$

Visual taken from <http://quark.physics.uwo.ca/~harwood/phys0/sci%20notation%20drill.html>

## Using Scientific Notation On Your Scientific Calculator

Make sure that the number in scientific notation is put into your calculator correctly.

1. Punch the number (the digit number) into your calculator.
2. Push the EE or EXP button. Do **NOT** use the x (times) button!!
3. Enter the exponent number. Use the +/- button to change its sign.
4. Treat this number normally in all subsequent calculations

### Scientific Notation Tutorials

- [http://www.wtamu.edu/academic/anns/mps/math/mathlab/col\\_algebra/col\\_alg\\_tut3\\_scinot.htm](http://www.wtamu.edu/academic/anns/mps/math/mathlab/col_algebra/col_alg_tut3_scinot.htm)
  - [http://www.visionlearning.com/library/module\\_viewer.php?mid=47&l=&c3](http://www.visionlearning.com/library/module_viewer.php?mid=47&l=&c3)
  - <http://www.wvnorton.com/chemistry/tutorials/ch1.htm>