Chemistry Notes

Day One

Summer 2011

1 Scientific notation

Scientific notation is a way of writing numbers that makes it easy to write very large and very small numbers.

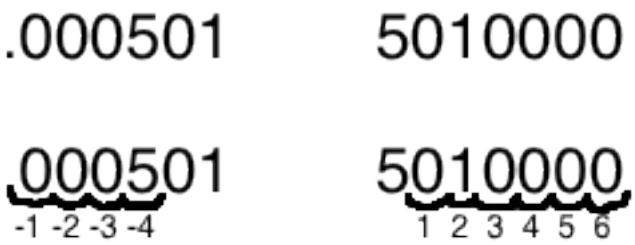
Remember that $10^{-x} = \frac{1}{10^x}$.

The first part of any number in scientific notation should be between one and ten in magnitude.

To convert a number to scientific notation, find the decimal point (or insert it if there isn't one), then move it so that the number is between one and ten in magnitude. Count the number of spaces you moved it; this is equal to the exponent.

1.1 Techniques

Count the number of places the decimal point moves to easily convert numbers to scientific notation:



5.01×10^{-4} 5.01×10^{6}

1.2 Examples

Ordinary notation	Scientific notation
50,000	5×10^4
50,000.	5.0000×10^4
0.000500	5.00×10^{-4}

2 Significant figures

Significant figures include all digits in a number except for zeroes that act as placeholders to indicate the scale of a number. For multiplication and division, the result should have as many significant digits as the measured number with the smallest number of significant digits. For addition and subtraction, the result should have as many decimal places as the measured number with the smallest number of decimal places.

3 Dimensional analysis

Dimensional analysis is a method of using units and conversion factors.

3.1 Example

The example below illustrates dimensional analysis begin used to find the number of seconds in two years.

$$? \text{ s} = 2.0 \text{ yr} \times \frac{365 \text{ days}}{1 \text{ yr}} \times \frac{24 \text{ hr}}{1 \text{ day}} \times \frac{60 \text{ min}}{1 \text{ hr}} \times \frac{60 \text{ s}}{1 \text{ min}}$$

$$= 6.3 \times 10^7 \text{ s (to 2 significant figures)}$$

4 Prefixes

name	symbol	magnitude
tera	T	10^{12}
giga	G	10^{9}
mega	M	10^{6}
kilo	k	10^{3}
hecto	h	10^{2}
deca	da	10^{1}
deci	d	10^{-1}
centi	c	10^{-2}
milli	m	10^{-3}
micro	μ	10^{-6}
nano	n	10^{-9}
pico	p	10^{-12}

5 Units

unit	symbol	type
meter	m	length
kilogram	kg	mass
liter	L	volume

6 Acknowledgements

Some information is taken from Wikipedia, Zumdahl's *Introductory Chemistry: A Foundation*, Caltech, and Texas A&M.