

## Calculations

There are a variety of calculations that you will be called upon to do routinely in the laboratory. Herein we present some of the most common.

**Dilutions:** It is often necessary to dilute a concentrated solution. The concentration of a solution may be too high to measure accurately, you may be setting up a standard curve, or you may be preparing complex buffer mixtures from stock solutions. You will need to be able to calculate the appropriate volumes of solution and diluent.

**Serial Dilutions:** It is a common practice to prepare a series of progressively more dilute solutions of a concentrated initial solution. You might do this to determine the number of bacteria in a culture, or prepare a standard curve for a protein assay. Whatever your reason, the basic approach is the same.

**Determine the dilution factor:** While it is not actually necessary to calculate the dilution factor for each successive dilution, it is often helpful to know the overall dilution factor for the entire series. This can be calculated by multiplying the dilution factors of each individual dilution step.



milli- (m-)	$10^{-3}$	1 thousandth
micro- ( $\mu$ -)	$10^{-6}$	1 millionth
nano- (n-)	$10^{-9}$	1 billionth
pico- (p-)	$10^{-12}$	1 trillionth
femto- (f-)	$10^{-15}$	1 quadrillionth
atto- (a-)	$10^{-18}$	1 quintillionth
zepto- (z-)	$10^{-21}$	1 sextillionth
yocto- (y-)	$10^{-24}$	1 septillionth

The only ones you will probably ever use are kilo-, centi-