Math and Dilutions

Microbiology is full of Math and Dilution Terminology. Luckily, once you become accustomed to using it, you will find that it is not difficult!

**Exponents: powers of 10**

$10^0 = 1$  (All numbers to the zeroth power equal 1)

$10^1 = 10$  (Ten to the first)

$10^2 = 100$  (Ten to the second)

$10^3 = 1,000$  (Ten to the third)

$10^4 = 10,000$  (You get the idea now, right?)

$10^5 = 100,000$

$10^6 = 1,000,000$

$10^{-1} = 1/10 = 0.1$  (Ten to the minus one or one tenth)

$10^{-2} = 1/100 = 0.01$  (Ten to the minus two or one hundredth)

$10^{-3} = 1/1,000 = 0.001$  (Ten to the minus three or one thousandth)

$10^{-4} = 1/10,000 = 0.0001$  (You see the pattern!)

$10^{-5} = 1/100,000 = 0.00001$

$10^{-6} = 1/1,000,000 = 0.000001$

**Dilutions**

A $10^{-2}$ (“ten to the minus two”) dilution means a “one to one hundredth dilution”, so to make this:

Mix 1 in 100 total (1 of your stuff plus 99 of diluent)

or 5 in 500 total  (5 of your stuff plus 495 of diluent)

or 10 in 1000 total (10 of your stuff plus 990 of diluent)

You could, also, dilute $10^{-1}$ and then dilute that $10^{-1}$ dilution again tenfold to make a serial dilution of $10^{-2}$ overall.