

Serial Dilution Grid

Worked 10-fold and 2-fold serial dilution series, with the stock and diluent volumes for each tube or well.

10-fold (log) serial dilution -- 1 mL tubes, stock 1 M

Each tube: 100 μ L of the previous tube (or the stock, for tube 1) + 900 μ L diluent, to 1 mL final.

Tube	Cumulative dilution	Concentration	Volume of stock	Volume of diluent
1	1:10	100 mM	100 μ L	900 μ L
2	1:100	10 mM	100 μ L	900 μ L
3	1:1,000	1 mM	100 μ L	900 μ L
4	1:10,000	100 μ M	100 μ L	900 μ L
5	1:100,000	10 μ M	100 μ L	900 μ L
6	1:1,000,000	1 μ M	100 μ L	900 μ L
7	1:10,000,000	100 nM	100 μ L	900 μ L

2-fold titration -- 12-well plate row, 100 μ L wells, stock 1 μ M

Each well: 50 μ L of the previous well (or the stock, for well 1) + 50 μ L diluent, to 100 μ L final. Well 12 is often left as a stock-free blank control instead of a 13th dilution step.

Well	Cumulative dilution	Concentration	Volume of stock	Volume of diluent
1	1:2	500 nM	50 μ L	50 μ L
2	1:4	250 nM	50 μ L	50 μ L
3	1:8	125 nM	50 μ L	50 μ L
4	1:16	62.5 nM	50 μ L	50 μ L
5	1:32	31.2 nM	50 μ L	50 μ L
6	1:64	15.6 nM	50 μ L	50 μ L
7	1:128	7.81 nM	50 μ L	50 μ L
8	1:256	3.91 nM	50 μ L	50 μ L
9	1:512	1.95 nM	50 μ L	50 μ L
10	1:1,024	977 pM	50 μ L	50 μ L
11	1:2,048	488 pM	50 μ L	50 μ L
12	1:4,096	244 pM	50 μ L	50 μ L

For a custom dilution factor, step count, or starting concentration, use the Serial Dilution tab in BenchMate's Molarity calculator: these volumes scale directly, since they depend only on the dilution factor, not the starting concentration.

Source: dilution mathematics (derived); step patterns follow standard practice described in Sambrook & Russell, *Molecular Cloning: A Laboratory Manual*, Ch 1.

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For the theory behind dilution mathematics, see Vol 1, Ch 1 of the *Biotech Techniques Bible*.

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