

# [Math in biotechnology field](https://assignbuster.com/math-in-biotechnology-field/)

[Science](https://assignbuster.com/essay-subjects/science/), [Mathematics](https://assignbuster.com/essay-subjects/science/mathematics/)

23 February Mathematics Assignment You are setting up a PCR reaction and the protocol asks you to add 0. 5ng of DNA to the reaction. You have a sample of DNA which is 5mg/ml. Describe your approach to adding the same volume in parts per million to the reaction? Be specific, describe your dilutions, how much you will pipette, etc?
From the 5mg/mL take 1ul and add 999ul or top it up to 1000ul, conc.= 5ug/mL
From the 5ug/ul, take 1ul and add 999ul or top it up to 1000ul, conc.= 5ng/mL
5ng/ml = 5ng/1000uL
0. 5ng = 100uL
But 1ppm = 1ng/uL, (IUPAC, 1: Myron, 217)
Yet our target 0. 5ng is in 100uL (0. 005ng in 1uL )
Therefore, based on 1ppm = 1ng/uL, target volume 0. 5ng = 0. 005ppm
2- You are setting up a PCR reaction and the protocol asks you to add 0. 2ng of DNA to the reaction. You have a sample of DNA which is 3mg/ml. Describe your approach to adding the same volume in parts per million to the reaction? Be specific, describe your dilutions, how much you will pipette, etc?
From the 3mg/mL take 1ul and add 999ul or top it up to 1000ul, conc.= 3ug/mL
From the 3ug/ul, take 1ul and add 999ul or top it up to 1000ul, conc.= 3ng/mL
3ng/ml = 3ng/1000uL
0. 3ng = 100uL
0. 2ng = 67uL
But 1ppm = 1ng/uL, (IUPAC, 1: Myron, 217)
Yet our target 0. 2ng is in 67uL (0. 00298ng in 1uL )
Therefore, based on 1ppm = 1ng/uL, target volume 0. 2ng/ul = 0. 00298ppm
3- You are setting up a PCR reaction and the protocol asks you to add 0. 9ng of DNA to the reaction. You have a sample of DNA which is 3mg/ml. Describe your approach to adding the same volume in parts per million to the reaction? Be specific, describe your dilutions, how much you will pipette, etc?
From the 3mg/mL take 1ul and add 999ul or top it up to 1000ul, conc.= 3ug/mL
From the 3ug/ul, take 1ul and add 999ul or top it up to 1000ul, conc.= 3ng/mL
3ng/ml = 3ng/1000uL
0. 3ng = 100ul
Therefore 0. 9ng = 300ul
But 1ppm = 1ng/uL, (IUPAC, 1: Myron, 217)
Yet our target 0. 9ng is in 300uL (0. 003ng in 1uL )
Therefore, based on 1ppm = 1ng/uL, target volume 0. 9ng/ul = 0. 003ppm
4- You are setting up a PCR reaction and the protocol asks you to add 3. 0ng of DNA to the reaction. You have a sample of DNA which is 8mg/ml. Describe your approach to adding the same volume in parts per million to the reaction? Be specific, describe your dilutions, how much you will pipette, etc?
From the 8mg/mL take 1ul and add 999ul or top it up to 1000ul, conc.= 8ug/mL
From the 8ug/ul, take 1ul and add 999ul or top it up to 1000ul, conc.= 8ng/mL
8ng/ml = 8ng/1000uL
8ng is in 1000ul
Therefore 3ng is in = 375ul
But 1ppm = 1ng/uL, (IUPAC, 1: Myron, 217)
Yet our target 3ng is in 375uL (0. 008ng in 1uL )
Therefore, based on 1ppm = 1ng/uL, target volume 3ng/ul = 0. 008ppm
5- You are setting up a PCR reaction and the protocol asks you to add 0. 6ng of DNA to the reaction. You have a sample of DNA which is 6mg/ml. Describe your approach to adding the same volume in parts per million to the reaction? Be specific, describe your dilutions, how much you will pipette, etc?
From the 6mg/mL take 1ul and add 999ul or top it up to 1000ul, conc.= 6ug/mL
From the 6ug/mL, take 1ul and add 999ul or top it up to 1000ul, conc.= 6ng/mL
6ng/ml = 6ng/1000uL
Therefore the 0. 6ng represents = 100ul
0. 6ng = 100ul
But 1ppm = 1ng/uL, (IUPAC, 1: Myron, 217)
Yet our target 0. 6ng is in 100uL (equivalent to 0. 006ng in 1uL )
Therefore, based on 1ppm = 1ng/uL, target volume 0. 6ng/ul = 0. 006ppm
Works cited
IUPAC, Compendium of Chemical Terminology, 997. Web. 22 Feb. 2015
Kaufman, Myron. Principles of thermodynamics. New York: CRC Press, 2002. Print.