

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

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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.