MICROBIOLOGY 102 – VIRTUAL EXPERIMENT 15B
SOLUTION TO THE "MPN" PROBLEM

A sample of lake water was diluted and inoculated into plates of **Plate Count Agar (PCA)** and tubes of **Lactose Lauryl Tryptose Broth (LLTB)** with Durham tubes. After incubation, the results were obtained as indicated on the following table. (Note: **Each** of the three columns of results on this table shows the observations for **two plates** and **three tubes**.)

dilution **of lake water**		10^0	10^{-2}	10^{-2}
amount inoculated		0.1 ml	1.0 ml	0.1 ml
plated dilution		10^{-1}	10^{-2}	10^{-3}
dilution factor (inverse of p.d.)		10^1	10^2	10^3
colony count on PCA		too numerous	88 & 84	9 & 6
no. of LLTB tubes with:	growth	3	2	2
	gas bubble	3	2	1

a. Determine the number of CFUs **per ml** of the lake water.

Using the formula from Appendix C:
ave. no. of colonies X dil.factor = CFU/ml of sample
86 X 10^2 = 8.6×10^3

b. Determine the presumptive, most probable number of coliforms **per ml** of the lake water. (Answer below.)

M I N I M P N T A B L E

number of positive tubes			MPN per inoculum of middle tubes
first set	middle set	last set	
3	3	3	>24
3	3	2	11.0
3	3	1	4.6
3	3	0	2.4
3	2	2	2.1
3	2	1	1.5
3	2	0	0.93
3	1	1	0.75
3	1	0	0.43
2	2	1	0.28
2	2	0	0.21
2	1	0	0.15
2	0	0	0.091
1	1	0	0.073
1	0	0	0.036
0	0	0	<0.036

- As the presumptive detection of coliforms is indicated by **growth and gas** in LLTB, we use the three values in the bottom row of the results table – i.e., **3 2 1**.
- Using the table on the right, **3 2 1 corresponds with 1.5** which is the average number of presumed coliforms inoculated into the **middle set of tubes** where each tube had received 1 ml of a 10^{-2} dilution (a 10^{-2} "plated dilution"). This is equivalent to **0.01 ml** of sample per tube. (Recall that the plated dilution is always equivalent to the amount of undiluted sample being plated.)
- Therefore, **1.5 coliforms in 0.01 ml** = **1.5×10^2 coliforms/ml**. The answer is also achieved by taking **1.5 X the dilution factor of the middle set of tubes**.