

Microbiology 102  
Take-Home Problem Set No. 1  
10 points total  
February, 2012

Name \_\_\_\_\_  
PLEASE DO NOT INCLUDE STUDENT ID NUMBER.

FOR EACH PROBLEM, CLEARLY INDICATE THE ANSWER AS WELL AS THE CALCULATIONS, WHICH GENERATE THE ANSWER. YOU MAY ATTACH ADDITIONAL PAGE(S) IF NECESSARY, BUT THE ANSWER MUST BE ON THIS SHEET. PLEASE READ THE TEXT AND TABLES CAREFULLY! YOU SHOULD BE ABLE TO WORK ON THESE PROBLEMS ON YOUR OWN OUTSIDE OF LAB TIME, NOT WITH OTHERS IN THE LAB. THIS SET IS DUE IN LAB ON FEB. 21-23 (depending on your section).

Background information including our definitions of “plated dilution” and “dilution factor” are given in Appendix C. Having done the practice problems will help in solving any dilution plating problem. (“Diluent” and “dilutant” are synonymous.)

1. (3 points) Ten grams of hamburger were mixed with 90 ml of sterile diluent. Three successive 1/10 dilutions were then made. One-tenth ml was plated from the last (most dilute) dilution onto **each of 2 plates** of an all-purpose medium. After incubation, 72 colonies were counted on one plate and 78 were counted on the other. Calculate the number of CFUs **per gram** of the original, undiluted hamburger.
2. (1 points) If the first dilution made in the problem above involved **one** gram of hamburger being added to **9** ml of diluent, (rather than 10 grams added to 90 ml), why should you not expect any change in the ultimate answer of CFUs per gram of hamburger?
3. (3 points) You are given a sample of undiluted lake water, some 9 ml dilution blanks, and three plates containing an all-purpose medium. You wish to do a “total aerobic plate count” to determine the CFU/ml of the water sample. As you will be preparing surface-inoculated plates, you do not want to inoculate more than 0.1 ml onto each plate.  
Diagram the procedure you would use to obtain plates representing  $10^{-3}$  through  $10^{-5}$  plated dilutions. In your diagram, be sure to clearly indicate the amounts of diluents and inocula.

4. (1 point) In the setup for problem 3, you obtain 140 colonies on the plate inoculated with **0.1 ml of the  $10^{-4}$  dilution** of the lake water. What would be the number of CFUs **per ml** of the original sample. (Consider what “plated dilution” is made here.)
5. (1 point) Ten ml of spring water was added to a petri dish to which was then added a sufficient amount of melted Plate Count Agar. The plate was allowed to solidify and was then incubated. After incubation, 55 colonies were counted. How many CFUs were present **per ml** of the original, undiluted spring water sample?
6. (1 point) The **same dilution** of a sample can be obtained for **all** of the following situations:
- The addition of 1 ml of the sample to 4 ml of sterile diluent.
  - The addition of \_\_\_\_\_ ml of the same sample to 40 ml of diluent.
  - The addition of 2 ml of the same sample to \_\_\_\_\_ ml of diluent.