

Preface

I hear and I forget

I see and I believe

I do and I understand

—Chinese proverb

Work in the microbiology laboratory is an exhilarating experience because it opens a window to an exciting and mysterious world of microscopic organisms. Most everyone has heard of microorganisms (microbes) but few have had the opportunity to work with them and get to know them well. The first-level microbiology course is particularly captivating because it is filled with experiences that elicit an “Awesome!”

Alcamo's Laboratory Fundamentals of Microbiology is intended for the introductory-level course. The numerous and varied exercises in this manual provide basic training in the handling and study of bacteria, viruses, protozoa, and fungi. Virtually all the techniques have application to the research and industrial laboratory. More important, the techniques give students the opportunity to explore and work within a world where the subjects are microscopic but the implications are vast.

Each exercise in this manual follows the general pattern of a research investigation. Introductory remarks provide background to the exercise and state its purpose. Special materials are then listed followed by detailed procedures. The results of the exercise are entered on separate sheets that, if required, may be removed and submitted for grading. A series of questions accompanies each exercise to reinforce the principles learned in the classroom.

Most exercises in the manual contain multiple parts, which may be performed separately or as part of a comprehensive study. Flexibility is provided by leaving the selection of test organisms to the instructor, and the list of required laboratory materials is minimal. Indeed, most of the exercises require nothing more than ordinary materials found in most labs.

The exercises assume that a number of materials are available to all students. These materials include glass slides, coverslips, lens paper, blotting (bibulous) paper, and a wax marking pencil or felt marker. The laboratory should provide Bunsen burners, inoculation loops and needles, culture racks, distilled water, immersion oil, stain apparatus, and so forth. Incubators set at 37°C and refrigerator space will also be needed. The exercises can be adapted to two-, three-, or four-hour laboratory sessions meeting once or twice per week.

A hallmark of this manual is the repetition of basic techniques to enforce and reinforce the important techniques of microbiology. Most exercises call for extensive tabulations and recording of results, since complete observations are paramount to laboratory investigations. Any exposure to pathogens is minimal or nonexistent, and students are encouraged to achieve a level of comfort in working with the microorganisms, for indeed, microorganisms are a wild and wonderful group.

This edition of *Alcamo's Laboratory Fundamentals of Microbiology* maintains a tradition of inviting students to immerse themselves in the microbiology laboratory and to use some of the basic principles of the microbial world. In addition to the standard procedures, there are notable exercises with yeasts (Exercise 9), with viruses (Exercise 8), and on microbial recycling (Exercise 28). There also are exercises on biofilms (Exercise 27), on the porosity of toilet tissue (Exercise 10), on the effect of garlic on bacteria (Exercise 31), and on the microorganisms normally found in milk (Exercise 32). Through all these, there is a blend of practical as well as fundamental procedures in microbiology.

A major goal of this manual is to provide the background and procedures to help students achieve reliable results in the laboratory. The "quick procedure" boxes, which give a brief overview of the techniques, and the marginal safety tips remain. I hope this manual will be a welcome friend and useful guide through the microbial world.

Many users of earlier editions had graciously corresponded and sent many valuable suggestions. I hope that instructors and students like you will continue this tradition, for you are the most important critics. I can be reached at the Department of Biology, Glendale Community College, 6000 W. Olive Avenue, Glendale, AZ 85302. I also would welcome an e-mail message at jeffrey.pommerville@gmail.com. Best wishes for a successful lab experience.

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