

Miramar College
Biology 205 Microbiology
Lab Midterm Study Guide

These objectives are intended as a study guide. This is not necessarily a complete guide and as such is not intended to be the sole source of your studies. You should use your notes, text, lab manuals, and other resources in order to make sure that you are fully prepared for your exam. Remember to look at the Objectives listed for every lab, these are a helpful guide to your studying as well. Topics & experiments covered in lab are fair game, even if you personally did not perform them. Remember to bring a calculator!

Lab 2: The Microscope

- Know the microscope, including parts, function, field of view, use, and care (including putting away your microscope properly).
- Understand how to calculate field of view for a microscope.

Lab Exercises 3–5: Aseptic Technique; Microbial Ubiquity; Pure Culture Techniques

- Know the principles of aseptic technique; the steps in transferring bacteria using sterile technique.
- Know the different methods for pure culture isolation and when you might use them.
- Be able to perform a streak plate (including proper labeling).

Lab Exercise 6: The Smear and Simple Staining

- Know the theory behind acidic and basic staining techniques.
- Know the goals and purpose of smears/heat fixation.
- Know the basics of stains covered in lab.

Lab Exercises 7, 9: The Gram Stain; Differential & Special Staining

- Know the principles behind stains.
- Be able to describe steps and the results of all 3 staining techniques.
- Be able to perform a successful Gram stain.

Lab Exercise 8: Microbial Motility

- Know the basics of bacterial motility.
- Recognize motile & non-motile bacteria.
- Know different techniques/protocols for observing motility.

Lab Exercise 10: Bacterial Growth Curve & Serial Dilutions Growth Curve and Serial Dilutions!!

- Practice these, understand these, know these!
- Be able to perform a serial dilution and calculate original cells/ml.
- Understand the differences between direct & indirect counting and how to calculate generation time.
- Understand the use of the spectrophotometer.
- Be able to plot data on a graph and determine generation time.

Lab Exercise 11: Physical Growth Requirements

- Know introductory material on temperature and pH effects on growth of microbes (names referring to the different “classes” of microbes).
- Know introductory material on O₂ requirements for growth.
- Understand how FTM and anaerobic jars provide an oxygen free environment, recognize growth in FTM media.

Lab Exercise 12: Physical Growth Control

- Know introductory material on how temperature and UV light control the growth of microbes.
- Understand how to interpret data for TDP and TDT.
- Understand the use of the control plate.

Lab Exercise 13: Chemical Growth Control

- Know introductory material on antiseptics and disk diffusion.
- Be able to calculate zone of inhibition and determine whether a given bacterial culture is sensitive to a given antibiotic.

Lab Exercise 15: pBluescript Transformation: Blue/White Colony Selection

- Know introductory material including the operon utilized on the pBluescript plasmid.
- Know the use of ampicillin, IPTG & X-gal in the experiment.
- Know how the general steps of the protocol work in the success & detection of transformed cells (including positive & negative controls).
- Know how to tell the difference between transformed and non-transformed cells.

Lab Exercise 16: DNA Fingerprinting

- Know the introductory material including that of PCR, agarose gel electrophoresis and the concept of DNA fingerprinting.
- Know the basic PCR protocol
- Know how to calculate the size of DNA fragments and how to relate the banding patterns of an agarose gel to the identification of DNA fingerprints.

Labs 14 & 17: Data Collection & Analysis

- Understand the difference between discrete and continuous data. Know how to plot both.
- Understand how to present data clearly, and how to interpret data that has been graphed.