

**Miramar College**  
**Biology 205 Microbiology**  
**Lab Midterm I Study Guide**

This is not necessarily a complete guide and as such is not intended to be the sole source of your studies. Use your notes, text, lab manual and other resources (*i.e.*, the Objectives section of the Labs) to make sure that you are fully prepared for your exam. Topics & experiments covered in lab are fair game, even if you personally did not perform them. Remember to bring a calculator!

**Lab 1: 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 2: Aseptic Technique**

- Know the principles of aseptic technique; the steps in transferring bacteria using sterile technique.

**Lab 4: Pure Culture Techniques**

- 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 7: Microbial Motility**

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

**Lab 5: 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.

**Labs 6 & 8: 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 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 by plotting data in a graph.
- Understand the use of the spectrophotometer.

**Lab 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 O<sub>2</sub> requirements for growth.
- Understand how FTM and anaerobic jars provide an oxygen free environment, recognize growth in FTM media.
- Know the chemical make-up of FTM.

**Lab 12: Physical Growth Control**

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

**Lab 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 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 controls).
- Know how to tell the difference between transformed and non-transformed cells on each of the media used.

**Lab 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 plot molecular markers on a graph and calculate the size of DNA fragments.
- Identify identical DNA fingerprints on an agarose gel.

**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.