

*This protocol contains a list of the experiments that will be performed each lab period. The experiments are designed to provide students with the best possible opportunity to have a successful learning experience. The protocols may not follow the procedures outlined in the lab manual some substitutions for organisms may be made. That information will be provided by the lab instructor. Students will be responsible for understanding the **principles** set forth in each experiment. In addition text book readings from Microbiology A Human Perspective by Nester 5th edition are listed which will further explain and help you understand the principles in these experiments.*

Laboratory Instructor: _____
Office/Laboratory: _____
Office phone: _____
Office hours: _____
E-mail address: _____

June 25**Lab 1**

Lab safety protocol
Aseptic Technique
Pure culture technique
Bacterial Distribution
Discuss: Genus and species; and morphology

Textbook readings:

Pg 90-1 Section 4.3 Obtaining a Pure Culture read through The Streak-Plate Method

Pg 113-4 Microbiology Laboratories

Pg 251-2 Culture Characteristics

Pg 11-2 Nomenclature

Pg. 246-7 Taxonomic Hierarchies

Pg 248 Nomenclature

Pg A-4-6 Appendix III Pronunciation Key

Pg G1-20 Glossary

June 26**Lab 2**

Complete aseptic technique; pure culture technique; bacterial distribution
Bright-field Microscopy
Making a Smear
Simple stain
Gram stain

Textbook readings:

Pg 42-6 Section 3.1 Microscopic Techniques: The Instruments read through Contrast

Pg 279 The Genus Corynebacterium

Pg 49-51 Microscopic Techniques: Dyes and Staining read up to Acid-Fast Stain

Pg 53-56 Section 3.3 Morphology of Prokaryotic Cells
Pg 250-1 Microscopic Morphology read through special stains
Pg 61-3 The Gram Positive Cell Wall and the Gram Negative Cell Wall read up to
the lipopolysaccharide molecule
Pg 65. Differences in Cell Wall Composition and the Gram Stain

June 28
Lab 3

Complete simple stain and gram stain
Capsule stain
Spore stain: Schaeffer-Fulton method
Acid-fast stain: Ziehl-Neelsen method
streak plate and gram stain practice

Textbook readings:

Pg 251 Special Stains
Pg 66 Section 3.7 Surface Layers External to the Cell Wall
Pg 51 Capsule Stain
Pg 462 Avoiding Recognition and Attachment (Capsules)
Pg 51-2 Endospore Stain
Pg 71-2 Endospores read up through Microcheck 3.9
Pg 280 Endospore-Formers
Pg 557-61 Lockjaw and Gas Gangrene
Pg 51 Acid-Fast Stain
Pg 688-90 Hansen's Disease (Leprosy)

July 2
Lab 4

Quiz 1 (Labs 1-3)
Complete capsule stain, spore stain, and acid-fast stain
Effect of Temperature, pH, and Salt concentration on bacterial growth
Effect of Ultraviolet light on cell viability
Streak plate for a grade

Textbook readings:

Pg 94 Section 4.5 Environmental Factors that Influence Microbial Growth
Pg 25 pH
Pg 106 Measuring Biomass (Turbidity)
Pg 57 Permeability of the Cytoplasmic Membrane
Pg 289-90 Section 11.9 Archaea that Thrive in Extreme Conditions
Pg 120-1 Radiation
Pg 197 Section 8.4 Repair of Damaged DNA

**July 3
Lab 5**

**Hand in Laboratory Reports (Labs 1-3)
Complete temperature, pH, salt concentration, and ultraviolet light
Atmospheric Growth Requirement testing
Bacterial population counts (Spread and Pour Plates Methods)**

Gram stain for a grade

Textbook readings:

Pg 105 Plate Counts

Pg A-1 Appendix I Microbial Mathematics

Pg 95-6 Oxygen (O₂) Requirements

Pg 102-3 Providing Appropriate Atmospheric Conditions

Pg 270-273 Section 11.1 Anaerobic Chemotrophs

Pg 277-9 Section 11.5 Aerobic Chemoorganotrophs

**July 5
Lab 6**

**Complete spread and pour plates; atmospheric growth
Differential and selective media
Staphylococci
Streptococci**

Textbook readings:

Pg 99-101 Section 4.5 Cultivating Prokaryotes in the Laboratory read up to
Providing Appropriate Atmospheric Conditions

Pg 287 Section 11.8 Bacteria that Inhabit the Skin

Pg 366-9 Section 15.1 Overview of the Innate Defenses and Section 15.2 First-
Line Defenses

Chapter 22 Skin Infections and Chapter 24 Respiratory System Infections

Pg 658-9 Staphylococcal Toxic Shock Syndrome

Pg 552-6 Section 23.2 Common Bacterial Wound Infections

**July 9
Lab 7**

**Quiz 2 (Labs 4-5)
Complete Staphylococci; Streptococci
Continue differential and selective media
Dental Caries
Preparation and care of stock cultures
Gram Positive Cocci Unknowns
Catalase production
Coagulase production
Novobiocin sensitivity**

Textbook readings:

Pg 614-6 Section 25.3 Bacterial Diseases of the Upper Digestive System

Pg. 91 Maintaining Stock Cultures

July 10

Lab 8 Continue identification of Gram Positive Cocci Unknown
Bacitracin, CAMP, SXT, Bile Esculin, 6.5% NaCl, and Optochin
****NOTE**** Any students that wants to bring in a water sample to test please collect
sampling bottle from instructor.

July 12

Lab 9 Quiz 3 (Labs 6-8)
Hand in Laboratory Reports (Labs 4-6)
Continue identification of Gram Positive Cocci Unknown
Detecting Coliform Bacteria in water: Multiple tube method
Bacterial Analysis of food
Motility

Textbook readings:

Pg 786 Section 31.2 Drinking Water Treatment and Testing

Pg 106 Most Probable Number (MPN)

Pg 114 Foods and Food Production Facilities and Water Treatment Facilities

Pg 117-8 Read Pasteurization through The Commercial Canning Process

Pg 126-7 Section 5.6 Preservation of Perishable Products

Pg 464-7 Superantigens

Pg 622-621 Section 25.5 Bacterial Diseases of the Lower Digestive System

Pg 690-2 Botulism

Chapter 32 Food Microbiology

Pg 66-9 Section 3.8 Filamentous Protein Appendages

Pg 77-8 Flagella and Cilia

July 16

Lab 10 Complete motility experiment
Complete identification of Gram Positive Cocci Unknown
Continue water experiment
Complete food experiment
Biochemical tests
Identification of Gram negative unknown
****NOTE**** Hand out vials for students to bring in mouth wash for next period

Textbook readings:

Pg. 252 Biochemical Tests

Pg 31-3 Section 2.5 Carbohydrates

Pg 27 Section 2.4 Proteins and Their Functions

The media in these experiments have been pre-inoculated to provide both a positive and negative test result. Students are to observe and record the reactions and where appropriate will perform certain tests

with the reagents provided. Tests will be available for observation over the next lab period. 1 set-up/3 students. Also: See Biochemical charts 1-8 in laboratory manual and the color pictures in the illustration binders.

Carbohydrate fermentation:

phenol red lactose blank

E. coli in phenol red lactose

P. vulgaris in phenol red lactose

Methyl red test (Mixed acid fermentation):

students will perform test with methyl red reagent

MRVP broth blank

E. coli in MRVP broth

E. aerogenes in MRVP broth

Voges-Proskauer test (Butanediol fermentation):

students will perform test with Voges-Proskauer reagents

MRVP broth blank

E. aerogenes in MRVP broth

E. coli in MRVP broth

Indole (Tryptophan hydrolysis):

tryptone broth blank

E. coli in tryptone broth

E. aerogenes in tryptone broth

students will perform test with Kovac's reagent

Urea hydrolysis:

urea broth blank

P. vulgaris in urea broth

E. coli in urea broth

Triple Sugar Iron Agar:

Triple sugar iron agar slant

P. vulgaris on Triple sugar iron agar slant

E. aerogenes on Triple sugar iron agar slant

Citrate utilization:

Simmon's citrate slant

E. aerogenes on Simmon's citrate slant

E. coli on Simmon's citrate slant

Phenylalanine deamination:

P. vulgaris on phenylalanine slant

E. coli on phenylalanine slant

dropping bottle of 10% ferric chloride

Decarboxylase

lysine decarboxylase blank

E. aerogenes in lysine broth

P. vulgaris in lysine broth

Lab 11

Quiz 4 (Labs 9-10)

Hand in Laboratory Reports (Labs 7-9)

Gram Positive Cocci unknown report due

Continue identification of Gram negative unknowns

Complete water experiment

Antiseptics Chemical Agents of Control: The Filter Paper Disk Method

Textbook readings:

Pg 112 Disinfection

Pg 114-5 Section 5.2 Selection of an Antimicrobial Procedure

Pg 121-6 Section 5.5 Using Chemicals to Destroy Microorganisms and Viruses

July 19

Lab 12

Continue identification of Gram negative unknowns

Complete antiseptics experiment

Isolation and Enumeration of Bacteriophages

Textbook readings:

Pg 319-24 Viruses of Bacteria Section 13.1 General Characteristics of Viruses

and Section 13.2 Virus Interactions with Host Cells up to Lytic Single-Stranded RNA Phages

July 23

Lab 13

Continue identification of Gram negative unknowns

Complete virus experiment

Antibiotic Sensitivity Testing: A. Kirby-Bauer test B. Synergistic effects

Determination of penicillin sensitivity

Textbook readings:

Chapter 21 Antimicrobial Medications

July 24

Lab 14

Quiz 5 (Labs 11-12)

Continue identification of Gram negative unknowns

Complete Antibiotics experiment; penicillin experiment

Slide agglutination test: Sure-Vue Select

Synthetic epidemic

Textbook readings:

Pg 366 1st paragraph In addition.. read up to Section 15.1 Overview of Innate Defenses

Pg 391 Section 16.3 The Nature of Antigens

Pg 392 Section 16.4 The Nature of Antibodies

Pg 426 Section 17.4 Agglutination Reactions

Pg 6-9 Medical Microbiology

Chapter 20 Epidemiology

July 26

Lab 15

Lab Exam (Labs 13, 14, comprehensive)

Gram negative unknown report due

Hand in Laboratory Reports (Labs 10-14)