

MICROBIOLOGY LABORATORY (BIOL 310L) SCHEDULE

Spring 2016

Lecture Professor: Dr. Susan Morrison
Lab Instructors: Ms. Tracy Hirsch (Sec. 1-3, 5-6)
Dr. Susan Morrison (Sec. 4)

Required:

- (1) Pearson Custom Laboratory Manual for BIOL 310L Microbiology, College of Charleston
- (2) Coursepack for BIOL310
- (3) Sharpie marker, Safety Glasses, Lab Coat; Ms. Hirsch also requires a **bound** composition notebook.

Experiment numbers are given on pages I—IV. For convenience, transfer those numbers to the orange blocks on the first page and results page of your Pearson Manual.

All students are expected to attend lab at their assigned lab time. There is limited space for additional students in most lab sections. If you cannot attend at your scheduled time, you must get permission in advance for each time you need to come to a different lab and you must have a reason the instructor deems valid.

LAB Ex. # & DATE SUMMARY OF LAB ACTIVITIES

SOURCE EXERCISES & READINGS

“Pack” pages refer to the BIOL 310 coursepack from SAS-E-Ink.

The Manual pages refer to the Pearson custom manual.

Everything that is listed must be read before coming to class.

Unless otherwise indicated, you should answer ALL questions in exercises that we do or read or discuss or see demonstrated. That includes questions with a light bulb, and questions in both the lab manual and the coursepack.

I January 12-14 INTRODUCTION; SAFETY; ASEPTIC TECHNIQUE; USE OF MICROSCOPES; EPIDEMICS; OBSERVATION OF PREPARED SLIDES; ENVIRONMENTAL SAMPLE

pp. 1-4; Pack 206-227	Laboratory Safety & Protocol
pp. 5-10	Microbiological Equipment & Basic Laboratory Techniques
Ex. 1	Culture Transfer Techniques (Q1-3)
Ex. 2 +	Techniques for Isolation of Pure Cultures:
& Pack 260-261	+ Part A. Isolation of discrete colonies from a mixed culture
	Part B. Isolation of pure cultures from a streak plate preparation
pp. 33-34	Microscopy
Ex. 4	Microscopic Examination of Stained Cell Preparations (Q 1-3)
Appendix p 327	Scientific notation (be able to use)
Pack 240-241	An Artificial Epidemic
Pack 243-246 +	Distribution of Microorganisms in the Environment (Q 1-6)

Notes:

+ indicates exercise for which follow-up will be necessary. The time in brackets [] indicates the approximate time span at which follow-up should be done.

⁹“Pack” pages refer to the BIOL 310 coursepack from SAS-E-Ink. The Manual pages refer to the Pearson custom manual. Appendix = an appendix in lab manual. You should familiarize yourself with it, but do NOT memorize. It is for reference only.

****NOTE:****In addition to the questions for exercises which you do, you are also responsible (on tests and in your notebooks) for questions in exercises requiring only reading and for results and questions for exercises done as demonstration. You are also responsible for all parts of the exercises done from the coursepack or handouts, as well as from the lab book.

II January 19-21 ASEPTIC TECHNIQUE (continued); PREPARATION OF SLIDES & OBSERVATION OF SIMPLE STAINS & NEGATIVE STAINS

- Ex. 1 Review Culture Transfer Techniques (pp. 11-16) **(Q 1-3)**
- Ex. 2 + Techniques for Isolation of Pure Cultures:
 & **Pack 260-261** Part A. Isolation of discrete colonies from a mixed culture
 Part B. Isolation of pure culture from a streak plate preparation **(Q 1-4)**
- pp. 53-55 Bacterial Staining
- Appendix p 341 Staining Reagents (for reference only)
- Ex. 9 Negative Staining **(Q 1-3)**
- Ex. 7 Preparation of Bacterial Smears **(Q 1-4)**
- Ex. 8 Simple Staining **(Q 1-3)**
- Pack 247-253** + Distribution of Microorganisms in the Environment ---complete using
 "Cultural Characteristics of Microorganisms"

III January 26-28 PREPARATION OF CULTURE MEDIA; THE AUTOCLAVE; PATHOGEN POSTER PROJECT INTRODUCTION GRAM STAIN; USE OF SPECIAL PURPOSE MEDIA (SELECTIVE & DIFFERENTIAL); ISOLATION OF PURE CULTURES; BEGIN IDENTIFICATION OF "UNKNOWN" BACTERIAL CULTURE;

- Pack 280-285** Begin pathogen poster project ---Organize teams of **4 students**, select pathogen & **normal microbiota**
- Pack 253-254** Preparation of Culture Media [read and understand; we will not be able to carry this out because our temporary lab is not adequately equipped.]
- Appendix p 331 Culture Media (for reference only)
- pp. 95-96 Cultivation of Microorganisms: Nutritional & Physical Requirements, and Enumeration of Microbial Populations
- Ex. 13 Nutritional requirements: Media for the routine cultivation of bacteria
- Ex. 33 Discussion of Enrichment Cultures
- Ex. 33 Physical agents of control: Moist Heat (Read pp. 221-222) **(Answer Q 1-6 as if you had done all procedures)**
- Pack 216-217** Taring a balance; use of a pipette bulb (read and understand)
- Ex. 10 Gram Stain **(Q1-5)**
- Ex. 14 + Use of Differential & Selective Media **(Q a-g & Q 1-2)**
- Pack 263-278** & Identification of Unknown Bacterial Cultures (next lab is deadline for having pure working culture of your unknown)
- Ex. 32 +
- Pack 246-252** & Cultural Characteristics of Microbes [use this information to evaluate "Distribution of Microorganisms in the Environment" & all other observations of microbial growth during semester]
- Ex. 3 +
- Pack 258-259** Dichotomous key practice—begin today (& continue in subsequent weeks)

IV February 2-4 DETERMINATION OF OXYGEN REQUIREMENT; METHODS FOR GROWING ANAEROBES; SPORE STAIN; CONTROL OF MICROBIAL GROWTH---with ULTRAVIOLET LIGHT; 2 BIOCHEMICAL TESTS

*****	DEADLINE: for pure working cultures of your unknown
pp. 219-220	Physical & Chemical Agents for the Control of Microbial Growth
Ex. 17 +	Physical Factors: Atmospheric Oxygen Requirements
Ex. 12 Part A	Staining for Visualization of Cell Structures: A. Spore Stain (Schaeffer-Fulton Method)(Q1-4) <i>[We will do a modification of this method without heat.]</i>
Ex. 35 +	Physical agents: Electromagnetic radiations (resistance of spores to UV) (Q2-5)
Ex. 18 +	Techniques for the Cultivation of Anaerobic Microorganisms (Q1, 3-5)
Ex. 29	Biochem: Catalase Test (Q1-4)
-----	Continue or complete ongoing exercises & identification of unknown cultures
Pack 258-259	Continue Dichotomous Key practice
Pack 280-285	Continue group work on Pathogen Poster & Normal Microbiota

V February 9-11 ACID-FAST STAIN; BIOCHEMICAL TESTS—SUGAR FERMENTATIONS; EXTRACELLULAR ENZYMES; REVIEW

pp. 95-96	Cultivation of Microorganisms: Nutritional and Physical Requirements
Ex. 11	Acid Fast Stain (Ziehl-Neelsen Method) (Q 1-5) --- demonstration slides
pp. 151-152	Biochemical Activities
Ex. 21 +	Biochem: Extracellular Enzymatic Activities of Microorganisms (Q 1,3)
Ex. 22 +	Biochem: Carbohydrate Fermentation [24hr] (Q 1-4)
Ex. 23 +	Biochem: Triple Sugar Iron Agar Test **[18-24hr]** (Q1-5)
Ex. 28 +	Biochem: Nitrate Reduction Test [24-48 hr](Q1-4)
Pack 258-259	Continue Dichotomous Key practice
	Continue or complete ongoing exercises & identification of unknown cultures
Pack 280-285	Pathogen Poster/Normal Microbiota Project continued

IMPORTANT SCHEDULE NOTE: You will need to return to the lab the next day (ideal) or the day after to read these test results. If reading of the results is delayed, they won't be accurate. You may come when another lab is in session so long as you don't disturb the class or interrupt the instruction. For those whose lab is on Thursday, there will be a time on Friday when the lab is open.

VI February 16-18

*****	**LABORATORY TEST (closed book)**
*****	**PRACTICAL TESTS: ASEPTIC TECHNIQUE, PLATE STREAKING & FOCUSING OF MICROSCOPE**
-----	Continue or complete ongoing exercises & identification of unknown cultures

REMINDER: Lab books may be collected and graded at ANY time during the semester; this could occur once or more than once and may be announced OR unannounced. You should come to class at all times with your lab book(s) organized, complete and up-to-date.

VII February 23-25 BIOCHEMICAL TESTS; MOTILITY (using WET MOUNTS & a SEMI-SOLID AGAR); BIOCHEMICAL I.D. SYSTEMS; CONTROL OF MICROBIAL- GROWTH---ANTISEPTICS & DISINFECTANTS

pp. 151-152	Biochemical Activities (continued)
Ex. 24+	Biochem: IMViC Test A. Indole; B. Methyl Red; C. Voges-Proskauer; D. Citrate (Q1-6)
Ex. 25 +	Biochem: Hydrogen Sulfide Test (Q1-5)
Ex. 5	Microscopic Examination of Living Bacterial Preparations
Ex. 48	Identification of Enteric Microorganisms Using Computer-Assisted Multi-Test Microsystems (demonstration) (Q1-5)
L71-74	Pathogen Poster project continued
Pack 280-285	Continue Dichotomous Key practice
Pack 263-278	Continue or complete ongoing exercises & identification of unknown cultures
-----	Continue identification of unknowns [See hint in next paragraph.]

*****Monday February 29---noon** *Deadline for requesting supplemental media for unknown culture identification.*** You may request new media not previously used, and will be advised whether it can be provided. All requests must be in writing or by e-mail to your instructor using the subject line : Special Media Request. Please explain why this medium is of value for identification of your unknown. For previously used media, you should indicate why it is necessary for you to repeat the test now if you did not repeat a test immediately after first reading the results. It may take 3-4 days to get these media prepared. **HINT:** Request media sooner to permit more time to apply those results.*

VIII March 1-3 DILUTIONS & PLATE COUNTS; WATER QUALITY TESTING (MPN)

Ex. 19 & Pack 286-295	+ Serial Dilution--Agar Plating Procedure to Quantitate Viable Cells
Pack 289, 302	Dilution problems (Q1-5, 7 ALL in coursepack)
p. 269	Microbiology of water
Ex. 41 +	Standard Qualitative Analysis of Water (Q 1-4)
	A. Presumptive Test: Determination of the Most Probable Number (Demo);
	+ B. Confirmed Test
	+ C. Completed Test
Appendix p. 329	Methods for Preparation of Dilutions
Handout	Continue exercise on pathogenic bacteria and normal microbiota
-----	Continue or complete ongoing experiments

IX March 8-10 Spring Break-----No Labs

X March 15-17 PROJECT WORK DAY

Pack 263-278	Continue identification of unknown cultures
Pack 258-259	Continue Dichotomous Key practice
Pack 280-285	Continue group work on Pathogen Poster & Normal Microbiota
	Major dishwashing effort; all contaminated materials that you are finished with should be placed in the discard area.

XI March 22-24 CONTROL OF MICROBIAL GROWTH---with ANTIBIOTICS, ANTISEPTICS & DISINFECTANTS

pp. 219-220	Physical & Chemical Agents for the Control of Microbial Growth
Ex. 36 +	Chemical Agents: Chemotherapeutic agents— Part A. Kirby-Bauer Antimicrobial Sensitivity Test Procedure Part B. Synergistic Effect of Drug Combinations
Ex. 38 +	Chemical agents of control: Disinfectants & Antiseptics
Handout	Continue exercise on pathogenic bacteria and normal microbiota
-----	Continue or complete ongoing experiments

MARCH 22-24 DEADLINE FOR SUBMITTING UNKNOWN REPORTS (submit to your lab instructor during your lab section; 10% penalty for each day late, including each weekend day; reports over 10 days late will not be accepted)

XII March 29-31 PATHOGEN POSTER PRESENTATIONS; MEDICAL MICROBIOLOGY; NORMAL MICROBIOTA

pp. 303-304	Medical Microbiology-Introduction
Ex. 47	Normal Microbiota of the Throat & Skin (read pages 417-418)
Pack 280-285	Completion of exercise/presentations on normal microbiota and on pathogenic bacteria
-----	Complete ongoing exercises
-----	Start Laboratory Checkout and Cleanup

XIII April 5-7

***** ****Cumulative LABORATORY TEST #2 (closed book)****

XIV April 12-14 Food Microbiology

page 259-260	Microbiology of Food
pack 296-301	Microbial Production of Food Products
pack 296	***Advance Assignment*** Sign up for the food item on sign-up sheets posted in the lab
Ex. 40	Wine production (read p. 265)

XV April 19-21 Since Monday classes are meeting on Thursday, April 21, **none** of our lab sections will meet this week.

Lab books may be collected and graded at ANY time during the semester; this could occur once or more than once and may be announced OR unannounced. You should come to class at all times with your lab book(s) organized, complete and up-to-date.

Important Note: If the schedule needs to be shifted because of class cancellation for a weather event, influenza, or other emergency during the term, the date of the lab final may change.

+ indicates exercise for which follow-up will be necessary. In some cases, this can be done during a scheduled laboratory. In other cases, it will be necessary to do this on days other than Tuesday or Wednesday. The time in brackets [] indicates the approximate time at which follow-up should be done.

⁸**Pack** *course pack laboratory section at end of coursepack (specific pages are changing due to renumbering & will be posted.*

Appendix *= an appendix in the lab manual. You should familiarize yourself with it and be able to use it, but do NOT memorize it. It is for reference only.*

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