

Microbiology

Biotechnology Academy Core Class

Mrs. Ziegenhirt, 681-7500, ext 8060
lziegenh@segusd.net

SHELDON HIGH SCHOOL VISION/MISSION STATEMENT:

The mission of Sheldon High School is to empower students to meet standards of excellence which foster intellectual curiosity and ready them to be responsible, productive, employable citizens in a culturally diverse society.

COURSE INFORMATION:

Students will study the role that microbes play in their everyday life. Microorganisms are a part of the human environment and are therefore important to human health. They are essential to the web of life in every environment. This course moves quickly - BE PREPARED!

COURSE OVERVIEW:

We will focus on four areas:

1. **Microbial Life.** Microbes themselves- the nature of microbes, the history of microbiology, how to control their growth, microbial growth and nutritional requirements, and how they are identified.
2. **The Microbial World.** Classification and taxonomy of microorganisms, study of the individual types of microbes (viruses, fungi, and protists).
3. **Microbes and Man.** Examination of the host-parasite relationship, epidemiology, and diseases caused by microorganisms.
4. **Microbes and the Environment.** The parts of microorganisms by humans (food microbiology, genetic engineering/biotechnology, and waste disposal) and their place in the environment (soil and aquatic microbiology).

OPEN LAB/MAKE UP DAYS:

- Open lab and make ups days are on Tuesday and Thursday mornings, any day during first lunch and after school (by appointment) in room D103. Please give me advanced notice so I may prepare the activity or assignment.
- You must come in within a week of your absence or forfeit the opportunity to make up the work.

MATERIALS SPECIFIC TO MICROBIOLOGY:

1. **Microbiology Workbook:** (\$10 to student store. Bring receipt to class.) To be paid for and received by Friday, August 31st.
2. **Scientific Notebook:** (lab book): Please purchase a lab book with sewn in pages. I would prefer that you have a quad grid lab book. Lab book are needed in class on Wednesday, August 29th.
3. **Other supplies:** Colored pencils, scissors, 2 glue sticks, ruler and all the items mentioned in A-G in the Biotechnology Academy Course Information and Procedures Handout. All required supplies in class on Wednesday, August 29th
4. **Textbooks:** *Foundations of Microbiology* by Talaro & Talaro
Biotechnology: Science for the New Millennium by Daugherty

EVALUATION INFORMATION FOR MICROBIOLOGY

ATTENDANCE/PROMPTNESS (10%):

- 10 points a day for being in class (EASY POINTS!!)
- If you miss a day you have the opportunity to make up these points during open lab within one week of your absence or forfeit those points.
- You can only make up attendance points from excused absences.
- No more than 30 points can be made up in a 9 week period.
- Unexcused Absences - You will lose 20 points for each unexcused absence and may not make up the points.
- 5 points a day for being prompt to class.
- You will lose your promptness points if you are not in your seat working on the warm up when the bell rings.
- Promptness points may not be made up.
- Sheldon's tardy policy will be enforced. Parents wishing to excuse their student's tardy for a medical or dental reason must provide written proof to the Attendance Office from the doctor of the appointment date and time along with the Doctor's phone number in order for the tardy to be excused.

PARTICIPATION (10%):

- 50 points will be given for participation every week.
- Participation points are completely subjective.
- I will be looking for the following behavior:
 - prepared with correct materials and assignments
 - participation in class discussions
 - participation in class laboratories and activities
 - appropriate self directed learners/on task behavior/use of time
 - meet project deadlines

LAB NOTEBOOK (Lab Book) (30%):

This will be one of your most important materials. All data, information, notes, etc. will be kept in your lab book. You will learn to use it as a reference guide during experiments, quizzes and tests. Therefore, it is important for you to keep it organized and follow instructions carefully. I will be collecting lab books at random intervals and if it is not in order or organized I reserve the right to reject grading it. NEATNESS COUNTS! KEEP THIS IN MIND!!!

SESSION PROJECT (10%):

You will be researching diseases that are caused by microorganisms. In addition you will prepare and present a Powerpoint presentation on one of the diseases.

SKILL/CONTENT QUIZZES (20%):

- Quizzes will be given every week covering the assigned reading material, lab activity, lectures, etc. ALL QUIZZES are OPEN LAB BOOK!
- These skill quizzes may be performance based or written assessments.
- Make up quizzes must be completed ASAP but, at the latest, within one week of the original quiz date.

FINAL EXAM (20%):

- The final exam is cumulative for the session as mandated by the district.

GENERAL ACADEMY REQUIREMENTS:

1. 70 credits from academy courses
2. "B" or better in all academy classes
3. 3.00 overall GPA, 2.5 session GPA
4. Community Service
5. 70% attendance at Biotech Club meetings
6. Participation in at least 4 "activities" per year
7. 95% school attendance rate (including excused and unexcused tardies and absences)

Forms

SHELDON HIGH SCHOOL PERSONAL INFORMATION SHEET

Name: _____ Grade: _____
 Address _____
 City _____
 Zip Code _____
 Home Phone #: _____
 Mother/ Guardian name: _____
 Daytime/work phone #: _____
 Email: _____
 Best time to contact: _____
 Father/ Guardian name: _____
 Daytime/work phone #: _____
 Email: _____
 Best time to contact: _____
 Counselor: _____

Class Schedule

Period	Class	Teacher	Room#
1			
2			
3			
4			

Lunch (Check one): _____ First Lunch _____ Second Lunch

Please indicate by your initials that you have read and understand the following forms found on page of your student's workbook.

INTERNET USE
 I understand and will abide by the Terms and Conditions for use of EDUCATIONAL USE INTERNET ACCOUNTS & OTHER INFORMATION TECHNOLOGY. I further understand that any violation of the regulations above is unethical and may constitute a criminal offense. Should I commit any violation, my access privileges may be revoked, school disciplinary action may be taken and/or appropriate legal action.

_____ Initials

STUDENT LAB CONTRACT

I understand the policies and protocol for lab work. I also understand that I am financially responsible for damages to lab equipment and supplies assigned to me and that I will be referred to administration for disciplinary action for intentional tampering with or damage of another student's project or work.

_____ Initials

ACADEMIC CODE OF CONDUCT

I have read and understand the ACADEMIC CODE OF CONDUCT and the consequences for any infraction.

_____ Initials

SYLLABUS

I have read the course syllabus and understand the policies and procedures of the course.

_____ Initials

Student Signature: _____

Parent Signature: _____

COMPUTER LAB USE AGREEMENT

Use of the Castellon Math-Science Computer Lab is a privilege and must be treated as such by students. Improper use of the computer lab will result in a revocation of the privilege and a score of zero for the assignment. In addition, you will not be allowed to use the computer lab for future projects, which may result in a score of zero for those assignments as well.

1. Use the computer lab only when your teacher is present.
2. Absolutely no food, drinks (including water), or gum in the computer lab at any time.
3. Keep all backpacks, bags, etc. at the edges of the classroom, against the wall.
4. Take only your paper and something to write with to the computer station.
5. Be careful with your feet, as you can kick the cords out of the floor causing all students in your row to lose unsaved work.
6. Follow all instructions given by your teacher exactly.
7. Do not check e-mail or visit any web-sites not related to your project.
8. Work only in your folder and do not open, move, or delete the work of other students.
9. Do all of your own work, including not copying and pasting from the internet or other student's work.
10. Do not print, unless instructed to do so by your teacher. (If your teacher allows you to print, you will be charged five cents for each sheet printed. Be careful.)

ACADEMIC CODE OF CONDUCT

The staff of Smedberg Middle School and Sheldon High School expects the highest standards of honesty and fairness from all students. To promote these ideals of education, responsibility and self-discipline are essential. Therefore, to protect everyone's right to a fair and meaningful evaluation, the ACADEMIC CODE OF CONDUCT has been adopted.

- A student who exhibits any behavior which in the judgement of the teacher indicates dishonesty while taking an examination or quiz shall receive a zero for that exercise.
- A student who copies an assignment from another shall receive a zero for that assignment, and the student who allows an assignment to be copied shall receive a zero.
- A student who, for the purpose of cheating on an examination, enters a classroom carrying evidence of premeditation—such as aids or notes not allowed—shall receive a zero for that examination.
- A student who commits plagiarism (copying a significant amount of text from published work) shall receive a zero for the work.
- A student who is apprehended for taking, without permission, another student's written assignment or project for personal use or academic credit shall receive a zero for that assignment and will be further disciplined under the provisions of theft in the student discipline policy.
- A student who displays unethical behavior and/or is involved in any other activity for the purpose of cheating, altering, or falsifying records, removing or copying of any materials (student, teacher, or other), et., shall be disciplined as follows:
 - A student enrolled in the course in which the infraction occurred shall receive a grade of "F" for the assignment/examination for which the infraction takes place. The student may be suspended for up to five days. Also, the infraction may affect any awards or honors the student may receive. This will be at the discretion of the committee(s) in charge of awards.
 - A student NOT enrolled in a course, however, who is involved in such an infraction, shall be disciplined in accordance with the student discipline policy.

Our laboratory procedures will be much more sophisticated than those of previous labs and at times will use very expensive pieces of equipment. The following guidelines are set forth in the interest of safety and order in the laboratory. More specific safety and laboratory management instructions will be given at the beginning of each experiment.

LABORATORY MANAGEMENT RULES

To minimize the risks of personal injury, environmental contamination, and damage to equipment, pay close attention to these instructions, review them before each lab and follow them with care.

- 1) Prepare for each lab by reading each exercise until you are familiar with the principles and procedures involved. Advance preparation will be absolutely essential for your safety and SUCCESS in completing the experiments in the allotted amount of time. Students who are not fully prepared for the experiment will NOT be allowed to conduct the experiment.
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- 4) Laboratory goggles should be worn during some of the laboratory experiments. This is to avoid contamination through unexpected splatters. I will let you know when goggles are necessary.
- 5) Wash your hands with soap and water before starting and after completing each lab exercise.
- 6) Do not eat, drink or apply make-up in the lab. Also, avoid hand-to-mouth activities, such as nail biting.
- 7) Dispose of wastes properly. Hazardous chemicals must be properly discarded in designated containers. I will inform you of proper disposal procedures. **DO NOT DISCARD ANY CONTAMINATED MATERIALS OR HAZARDOUS CHEMICALS IN SINKS OR WASTE BASKETS.**
- 8) Report any spills, accidents or injuries to me as soon as possible.
- 9) At the end of the lab period, return all equipment to the place of origin. Since other classes use this lab, this room must be kept clean and orderly.
- 10) Please strap your work and listen to lab directions that I give during the experiment. I often point out safety precautions you must know to perform the lab successfully with minimal risks to yourself and others.

Responsible Handling and Disposal of Bacteria

Adherence to simple guidelines for handling and disposal makes working with different bacteria a non-threatening experience.

1. To avoid contamination, always re-plate inoculating loop one final time before placing it on lab bench.
2. Do not over incubate plates. Because a large number of cells are inoculated and with longer incubation contaminating bacteria can arise.
3. Collect treatment- bacterial cultures and tubes, and pipets that have come into contact with the cultures. Disinfect these materials as soon as possible after use. Disinfect bacteria-contaminated materials using the following treatment:
 - a) Treat with solution of 10% bleach. Immerse contaminated materials directly into tub containing bleach solution. Plates should be placed, with lids open, in tub, and flood with bleach solution. Allow materials to stand in bleach solution for 15 minutes or more. Then drain excess bleach solution, seal materials in plastic bag, and dispose in regular garbage.
4. Wipe down lab bench with soapy water, 10% bleach solution or bleach/antibacterial wipe cloth at the end of the lab period.
5. Wash hands with soap and water before leaving the lab.
6. Follow all safety rules put forth in the Laboratory Management Rules hand out.

I have read and understood the regulations for the proper handling and disposal of bacteria. I agree to abide by these rules and regulations or forfeit my right to participate in laboratory procedures involving any type of microorganisms.

(Print your name)

(Date)

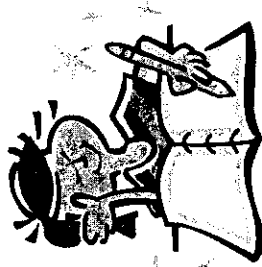
Teachers Initials: _____
(Sign your name)

Laboratory Notebook Policy

Based on the Laboratory Notebook Policy at Applied Biosystems, Foster City, CA.

Why is proper record keeping in a bound notebook important?

In the US, the first person to conceive and show diligence to develop an invention, product, or process is awarded the patent for that product or process. Notebooks, properly kept and witnessed, are legal evidence of conception and diligence to practice an invention.



Record Keeping Procedures:

1. Use only your official Biotechnology notebook to record your work. All work must be recorded in the notebook and no other document.

2. Write your name (first and last) on the outside cover. Identify this notebook as "Microbiology, 07"

3. Maintain a Table of Contents as you make entries in the notebook. The first page of every lab investigation should be in the Table of Contents. Set up your Table of Contents on the first four pages. Write "Table of Contents" at the top of each of these pages.

Table of Contents

Assignment	Page #
Course Syllabus	5
HWAS: Week of	6

4. Number all the pages in INK. Start with p. 1 on the first page after the TOC. Number both the front and back of each sheet on the top, outside corner.

5. Glue your "biotechnology Academy Course Information and procedures" onto the inside back cover of the notebook.

6. Glue this sheet onto page 6 of your notebook.

7. Glue the "Course Information" sheet onto page 7 of your notebook.

8. Date and initial every page. Sign and date at the end of an experiment.

9. Make all entries legible in **black or blue permanent ink only**. No pencil entries. Colored pencils are acceptable on drawings, as directed by your teacher.

10. Do not erase, ink-over, or white-out any errors. Line through errors so they can still be read. Place your initials by the correction.

11. Reference previous work or projects as imperative background information. Use "From", "See page..." or "Go to..." statements to tie together sections of a lab report or continuous work.

12. When procedures, data, conclusions, etc. are continued from previous pages, each one must have a "from page # ___" listed. When continuing to another page, there should be a "go to" statement directing the reader to the continuation of work.

13. Record all directions, materials, and quantities used plus reaction or operating conditions in sufficient detail and clarity so someone of equal skill could understand or repeat the procedures if necessary.

14. Avoid abbreviations and codes when possible. Only abbreviations for metric measurements may be used universally.

15. List all persons from whom samples or data were obtained, shared, or transferred.

16. Attach as much original data as practical in the notebook. Where it is not practical to attach original data, attach examples and make clear reference to where the original data is stored.

17. For important entries, such as key conclusions or new ideas, have a coworker sign and date the entry. Be sure the coworker is not a co-inventor but is capable of understanding the meaning of the notebook entry.

18. Write/print clearly so there is no ambiguity as to the information recorded. Skip lines between data tables graphs, and important conclusions to make it easier to find and read recorded information. Use a ruler to draw tables and charts.

19. Neatly cut out and completely glue in assignments from Microbiology Workbook when directed by your teacher.

Microbiology

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 Mother/ Guardian name: _____
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 Email: _____
 Best time to contact: _____
 Father/ Guardian name: _____
 Daytime/work phone #: _____
 Email: _____
 Best time to contact: _____
 Counselor: _____

Class Schedule

Period	Class	Teacher	Room#
1			
2			
3			
4			

Lunch (Check one):
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Responsible Handling and Disposal of Bacteria

Adherence to simple guidelines for handling and disposal makes working with different bacteria a non-threatening experience.

1. To avoid contamination, always re-sterilize inoculating loop one final time before placing it on lab bench.
2. Do not over incubate plates. Because a large number of cells are inoculated and with longer incubation contaminating bacteria can arise.
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(Print your name)

(Sign your name)

Teachers Initials:

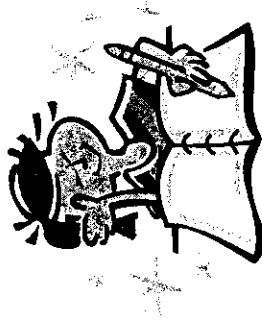
(Date)

Laboratory Notebook Policy

Based on the Laboratory Notebook Policy at Applied Biosystems, Foster City, CA.

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4. Number all the pages in INK. Start with p. 1 on the first page after the TOC. Number both the front and back of each sheet on the top, outside corner.

5. Glue your "biotechnology Academy Course Information and procedures" onto the inside back cover of the notebook.

6. Glue this sheet onto page 6 of your notebook.

7. Glue the "Course Information" sheet onto page 7 of your notebook.

8. Date and initial every page. Sign and date at the end of an experiment.

9. Make all entries legible in black or blue permanent ink only. No pencil entries. Colored pencils are acceptable on drawings, as directed by your teacher.

10. Do not erase, ink-over, or white-out any errors. Line through errors so they can still be read. Place your initials by the correction.

11. Reference previous work or projects as imperative background information. Use "From", "See page..." or "Go to..." statements to tie together sections of a lab report or continuous work.

12. When procedures, data, conclusions, etc. are continued from previous pages, each one must have a "from page # ___" listed. When continuing to another page, there should be a "go to" statement directing the reader to the continuation of work.

13. Record all directions, materials, and quantities used plus reaction or operating conditions in sufficient detail and clarity so someone of equal skill could understand or repeat the procedures if necessary.

14. Avoid abbreviations and codes when possible. Only abbreviations for metric measurements may be used universally.

15. List all persons from whom samples or data were obtained, shared, or transferred.

16. Attach as much original data as practical in the notebook. Where it is not practical to attach original data, attach examples and make clear reference to where the original data is stored.

17. For important entries, such as key conclusions or new ideas, have a coworker sign and date the entry. Be sure the coworker is not a co-inventor but is capable of understanding the meaning of the notebook entry.

18. Write/print clearly so there is no ambiguity as to the information recorded. Skip lines between data tables graphs, and important conclusions to make it easier to find and read recorded information. Use a ruler to draw tables and charts.

19. Neatly cut out and completely glue in assignments from Microbiology Workbook when directed by your teacher.

Getting to Know Your Textbook
Biotechnology: Science for the New Millennium

- 1) Look at the table of contents of both the text and the lab manual.
 - a. How many chapters are in the textbook? _____
 - b. Each text chapter begins with a focus on a _____
 - c. What is the title of Chapter 9 in the text? _____
- 2) On what page of the text does the glossary begin? _____
 - a. What is the definition given for "recombinant DNA"? _____
 - b. What is the definition given for "volume"? _____
- 3) On what page does the index begin? _____
 - a. On what pages can information about bacterial viruses be found? _____
 - b. On what pages can information about hydroponics be found? _____
- 4) The *Preface* explains how the book is divided into four focus areas. Describe them below:
 - a. Chapters 1-5 focus on _____
 - b. Chapters 6-9 focus on _____
 - c. Chapters 10-12 focus on _____
 - d. Chapters 13-14 focus on _____
- 5) Look through Chapter 4.
 - a. Who is the subject of the career focus, what is his job, and where does he work? _____
 - b. How many *Learning Outcomes* are given at the beginning of the chapter? _____
 - c. Into how many sections is this chapter divided? _____
 - d. Look on page 105. How many terms are defined in the margins? _____ What is the definition of "broth"? _____

- e. Look on page 107. How many figures are there? _____ Look at each one. How many chromosomes are found in a human cell? _____ Which figure caption provides the chromosome number information? _____
- f. The *Biotech Online* activities, which require using the Internet, are designed to reinforce and expand your knowledge and interest. How many *Biotech Online* activities are found in Chapter 4? _____
- g. How many *Section Review* questions are found in Section 4.3? _____
- h. In the *Chapter Review* at the end of the chapter, the vocabulary terms from the page margins are listed. How many *Speaking Biotech* terms are listed in Chapter 4? _____
- i. What color are the *Summary of Concepts* bullets in the *Chapter Review*? _____
- j. What color are the *Lab Practices* bullets in the *Chapter Review*? _____
- k. How many *Thinking Like a Biotechnician* questions are found in the *Chapter Review*? _____
- l. *Biotech Live* activities offer in-depth projects to reinforce and expand your knowledge. How many *Biotech Live* activities are found in Chapter 4? _____
- m. A *Bioethics* dilemma is presented at the end of each chapter. What is the *Bioethics* dilemma presented at the end of Chapter 4? _____
- 6) In Figure 5.2, what protein is depicted in the computer-generated model? _____
- 7) In Table 10.1, how many plant tissue types are described? _____
- 8) In what chapter is forensics discussed? _____
- 9) Which figure, in which chapter, shows "Dolly, the cloned sheep"? _____
- 10) The back cover describes the Encore CD packaged with the text and lab manual. Name three of the helpful items included on the Encore CD.
 - a. _____
 - b. _____
 - c. _____
- 11) Read the "About the Author" page. What is the name of the author's chihuahua?

DISEASE RESEARCH PROJECT FORMAT

DISEASE NAME:

MAIN CLINICAL SYMPTOMS:

Including Early onset symptoms and progression of symptoms over the course of illness, length of time between initial exposure and onset of symptoms.

Optional Copy and paste picture of patient with symptoms

SCIENTIFIC NAME OF ETIOLOGICAL AGENT: (Name of Pathogen)

CLASSIFICATION: (Bacteria, Virus, Fungi, Parasite, Prion, etc.)

CHARACTERISTICS

Including Bacteria: nutritional requirement (preferential media), oxygen requirement, optimum temperature range, pH tolerance, size, shape, arrangement (morphology).

Including Virus: size, shape, natural host or reservoir, DNA or RNA.

Including Copy and paste color picture of pathogen.

MODE OF TRANSMISSION:

air, water, food (be specific), touching, fomites, saliva, bodily fluids, sharing utensils, drinks, Chapstick, etc, direct contact with pathogen, life cycle, including vector, if a parasite.

DIAGNOSIS/IDENTIFICATION:

Including for Bacteria: reaction to biochemical tests, Gram stain and/or differential stain reaction, microscopic description of colony morphology, microscopic description

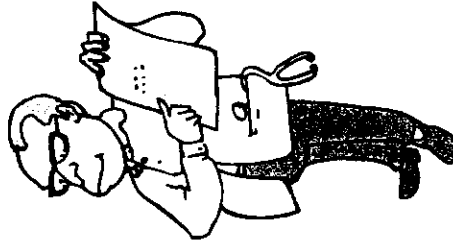
SUSCEPTIBILITY AND RESISTANCE:

Which segment of the population, whether because of age, gender, or lifestyle choices, are more likely to be exposed to the pathogen?

TREATMENT: Antibiotics, vaccination, quarantine, antifungal meds, symptomatic, rest

ADDITIONAL REMARKS:

REFERENCE: website, title/author of book



CONVENTIONS:

1. The first page in your binder should be a signed copy of the Sheldon Academic Code of Conduct.
2. Diseases should be alphabetized and neatly secured in a three ring binder. Table of Contents, dividers and sheet protectors are optional.
3. Each disease is limited to ONE page (front side only). The format is up to you as long as it contains all the required components. Please use the labels for each component in the terms as stated above.
4. Each page should be numbered in the upper, right hand corner.
5. Each page should be initialed in the lower, right hand corner.
6. Information MUST be handwritten, neatly and in ink. You will not get credit for information I cannot read.
7. Information should be in bullet format. To use the information quickly and efficiently, it is not logical to write in paragraph format.
8. Do not put any extra pages in your binder.

Disease Research Project

1.	Anthrax (subcutaneous and pulmonary)	28.	Streptococcus pneumoniae, drug-resistant
2.	Avian Flu	29.	Influenza –Type A
3.	Botulism	30.	Tetanus
4.	Norwalk Virus	31.	Toxic-shock syndrome
5.	Diphtheria	32.	Infectious Mononucleosis
6.	Necrotizing fasciitis - Type 1	33.	Tuberculosis
7.	West Nile	34.	Typhoid fever
8.	Escherichia coli 0157 :H7	35.	Varicella (chickenpox)
9.	Ebola Hemorrhagic Fever	36.	Shigellosis
10.	Hantavirus pulmonary syndrome	37.	Impetigo
11.	Hemolytic uremic syndrome (HUS)	38.	Cat Scratch Fever
12.	Hepatitis A	39.	Creutzfeldt -Jakob Disease
13.	Hepatitis C	40.	Dengue Fever
14.	Conjunctivitis "Pink Eye"	41.	Measles
15.	Gangrene	42.	Meningococcal disease - bacterial
16.	Legionellosis	43.	Meningococcal disease - viral
17.	Listeriosis	44.	Mumps
18.	Lyme disease	45.	Pertussis
19.	SARS- Sever Acute Respiratory Syndrome	46.	Plague (Black Death)
20.	Scabies	47.	Poliomyelitis
21.	Scarlet Fever	48.	Rabies
22.	Septic Shock	49.	Rubella
23.	Shingles	50.	Salmonellosis
24.	Smallpox		
25.	Strept. throat		
26.	Warts		
27.	Tinea - One page but refer to location of infection of each		
	- Tinea barbae - Tinea cruris		
	- Tinea capitis - Tinea nigra		
	- Tinea corporis - Tinea pedis		
	- Tinea manu - Tinea versicolor		

Disease:

P.

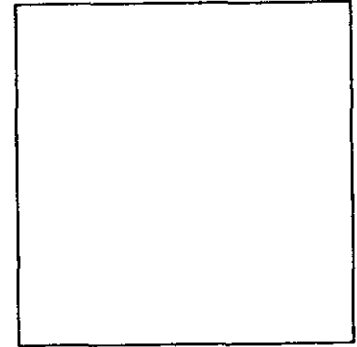
Main Clinical Symptoms:

Etiological agent:

Morphology:

Gram stain (if a bacterium):

Chief characteristics of etiological agent:



Mode of transmission:

Diagnosis/identification:

Methods of Control:

Susceptibility and resistance:

Treatment:

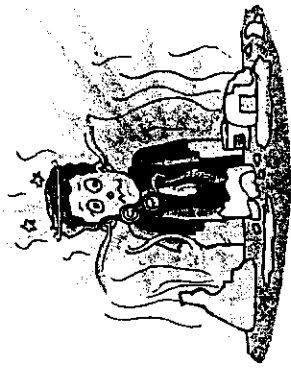
Additional remarks:

Researched by:

Lab Safety Map

Directions: Include the following labeled safety equipment or features on the map of the room.

1. Heat and Acid Resistant Lab Stations - (8)
 - o sink
 - o GFC Plugs
 - o gas/air jets
 - o disinfectant spray bottles
2. Exits - (3)
3. Telephone
4. Eye Wash Station
5. Hand washing stations- (2)
6. Teacher Demo Table
7. Fire Blanket
8. Fire Extinguisher
9. Broken glassware box
10. Vent switch
11. Safety Shower
12. Gas Shut Off valve
13. Safety Spec Drawer



Also include the following labels for classroom supplies:

- Microscope Cabinet
- 3 hole punch, stapler, tape
- paper cutter
- Kleenex
- Returned papers
- Garbage cans - (3)
- Supplies: colored pencils, rulers, scissors, markers
- Cleaning supplies
- Incubator
- Computer Cart
- Specimen stock fridge
- Deionized Water Container

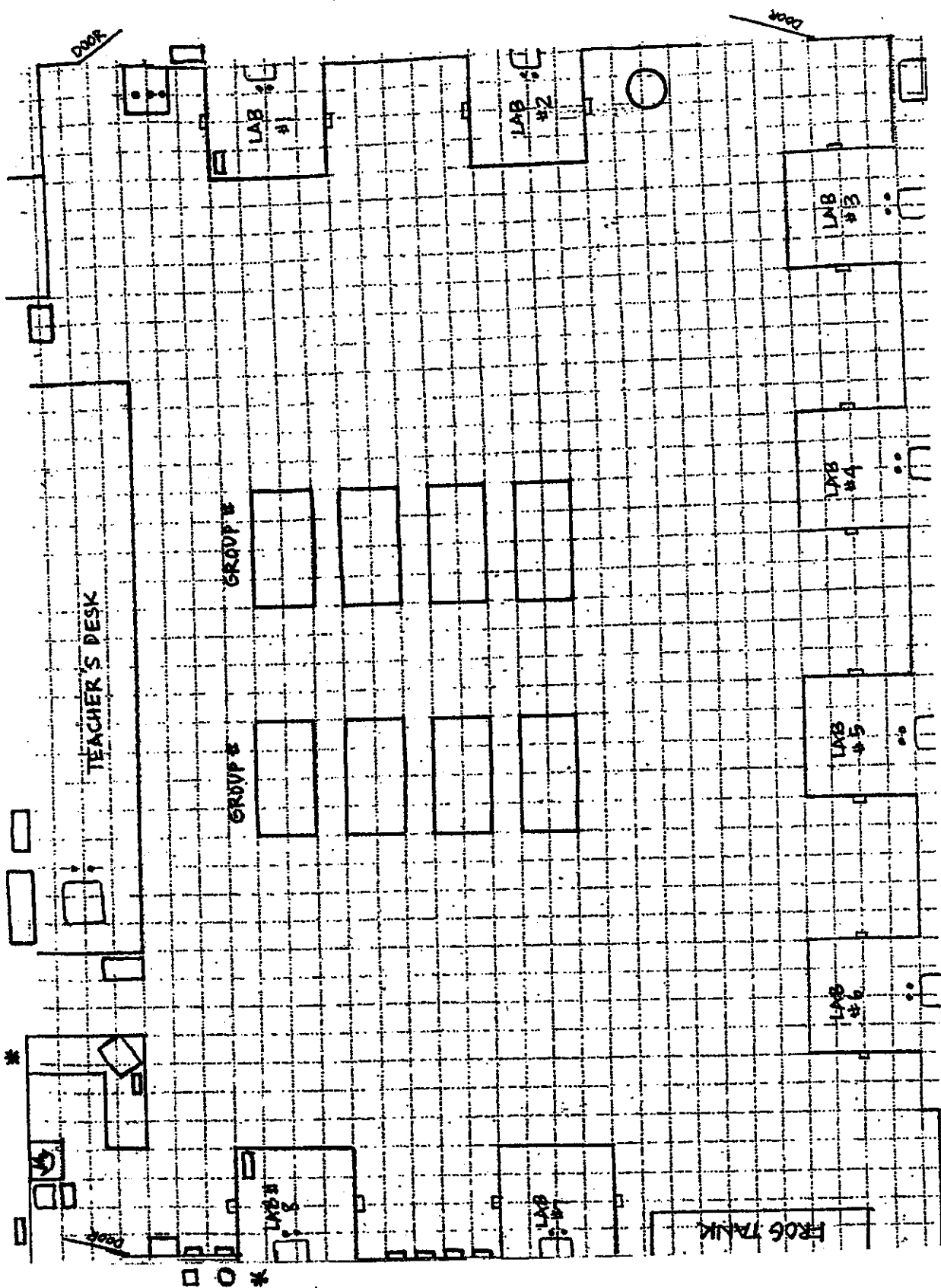
Example Safety Scenario

Mary is taking a microbiology course during summer school. She is learning how to culture bacteria. As the teacher is explaining the instructions for today's lab experiment, Mary is trying to hurry up and finish last night's math homework. She does not hear the important safety precautions. Mary and her lab team begin the experiment by washing their hands with soap and water and putting on their goggles. Mary plates her bacteria and then gets out her pretzels to eat while she watches her lab partner plate his bacteria. When Mary and her lab partners are finished plating their bacteria they throw their inoculating loops in the trash can. As Mary comes back to her lab station she knocks over a test tube of sodium hydroxide. She gets nervous and takes the sponge next to her lab sink and wipes it up quickly before the teacher can see. After the experiment is complete, Mary disinfects her lab station and again washes her hands with soap and water.

Safety Scenario #1

Name of Author/Artist:

Safe Lab Safety Practices	Dangerous Lab Safety Practices
1.	
2.	
3.	
4.	



EXPERIMENTAL DESIGN FORMAT

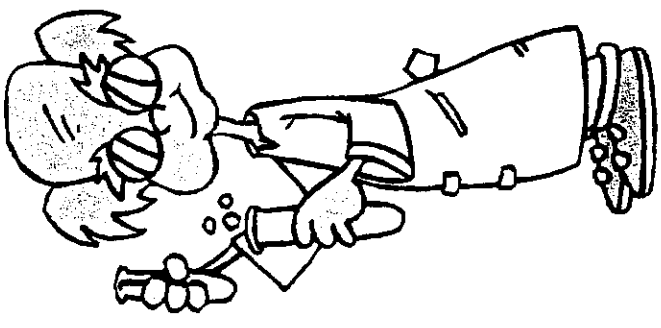
- PRE-LAB** (Complete this part of the ExD BEFORE starting a lab)
- **PROBLEM:** (What scientific problem are you trying to solve?)
 - **LAB TITLE:** (The Effect of _____ on _____.)
 - **INDEPENDENT VARIABLE:** (What is the cause agent? What are you changing?)
 - **DEPENDENT VARIABLE:** (What is being measured?)
 - **DATA:** The I.V. groups should be listed as column headings. The number of trials will determine the number of rows in your table. Be sure to indicate in what units your numerical data is measured. Lastly, write a title that clearly and concisely states what the experiment was investigating. Include specific organisms when necessary.

TABLE 1: Zone of Inhibition (mm) Produced by the Bark from N. American Trees

	Spruce	Pine	Manzanita	Fir	Blank
<i>E. coli</i>					
<i>Bacillus subtilis</i>					

- **EXPERIMENTAL CONSTANTS:** (Variables not altered during the experiment. List in bullet format)
- **CONTROL:** (What is the experimental group being compared to?)
- **HYPOTHESIS:** (Use an "If...then...." format. State the cause and effect relationship between the D.V. and the I.V. Must be testable.)
- **PROCEDURE:** (Create a numbered list of instructions that break down larger tasks into small bits of direction).
- **MATERIALS:** (List the equipment/materials and quantity needed).
- **SET UP:** (Diagram experimental set up with labels)

- POST LAB** (Complete this part of the ExD AFTER collecting the data)
- **DATA ANALYSIS:** (If applicable, use the appropriate graph format - line, bar, pie, etc.- to represent the data.)
 - **CONCLUSION:** Discuss the data in terms of either
 - supporting the hypothesis,
 - refuting the hypothesis or,
 - inconclusive
- Be sure to reference you data tables and graphs. Always cite evidence from the data obtained. Make sure to discuss possible experimental errors and how they may have affected your results.



Keep this sheet in your notebook for reference. Each time we do a full lab experiment you will be required to follow these steps to fill out your Experimental Design Lab Write Up.

Experimental Design Practice

Scenario 1:

Jackie read that Aloe vera promoted healing of damaged tissue. She decided to investigate the effect of varying amounts of Aloe vera on the regeneration of planaria. Jackie selected 20 planaria of equal age and size. She bisected 5 planaria to obtain 10 parts (head/tail combinations) for each experimental group. She applied concentrations of 0%, 10%, 20%, and 30% Aloe vera to the groups. Fifteen ml of the Aloe vera solutions were applied. All planaria were maintained in a growth chamber with identical food, temperature, light cycle and humidity. Using her dissecting scope, Jackie measured the regeneration of the planaria parts every day for 10 days.

Problem:

Independent Variable:

Dependent Variable:

Lab Title:

Data:

Experimental Constants:

-
-
-
-

Control:

Hypothesis:

Problem:

Independent Variable:

Dependent Variable:

Lab Title:

Data:

Experimental Constants:

-
-
-
-

Control:

Hypothesis:

Problem:

Independent Variable:

Dependent Variable:

Lab Title:

Data:

Experimental Constants:

-
-
-
-

Control:

Hypothesis: