

OVERVIEW

Biology is all around us, but it is easy to overlook if you don't know what to look for. I hope that from this class you will learn to appreciate more of the living things around you, how they work, and how they interact with each other. I also hope that you will be better prepared to read science to help you become healthier, more informed individuals.

ATTENDANCE/TARDIES

Students miss a great deal when we have discussions and labs. It is difficult to make up many of these classroom activities and so attendance is a very important part of success in science. Students are responsible for having their absences excused. OHS attendance and tardy policies will be followed; check your student handbook. Students not in their seat and/or prepared to work at the bell are tardy.

MAKE-UP WORK

Work missed during excused absences can be made up within the number of days absent. For example, if you are out 3 days, you have 3 days after you return to make up the work you missed. Quizzes will be made up at the teacher's discretion. **Students are responsible for getting their assignments on their own time.** Come see me before/after school, check the class website, or email me.

GRADING

Notebooks -- students are required to keep notebooks (3 ring binder) to include all written work, tests, quizzes, lab reports, etc... (Even this course outline should be kept in your notebook.) Notebooks will be checked and graded periodically.

Community service -- students are required to perform 10 hours of **supervised** and **pre-approved** community service each semester. Biology-related events will count as double. Opportunities will be posted online as they arise. A separate form must be completed by Jan. ____ and June ____.

Term project -- All students will complete one term project each semester, one of which should be original research. Each should include at least a two page single spaced write-up. All work must be biology related, written using appropriate grammar, sentence and paragraph structure and spelling, be typed and include appropriate MLA citations. Use scientific terms as much as possible. When you are asked to "comment" be thoughtful. Just saying "*I thought it was interesting.*" or "*I didn't like it.*" is not acceptable. All of these things must be done for a grade of 80%. If you want a higher grade, you need to do something extra, something above and beyond the norm. **Date Due: Fall Jan. Spring June** **No class time will be dedicated for this project. It will be done on your own time.** See the class website or below for project ideas (choose one, or see Miss Kirk if you have another idea).

* Article Review: Find a 4+ page peer-reviewed article in the science press (such as Nature, Science, Science News, Scientific American, Discover, National Geographic) related to biology. Summarize and comment on the article.

* Interview: Interview a person in a biology-related career (medical personnel, fish biologist, environmental scientist, researcher, etc.). Learn about what they do, their education and previous experiences. You must also spend some time with them on the job.

* Video Review: Watch a biology-related video or television program (NOVA, Discovery, Nature of things, National Geographic, etc.). Summarize and comment on the program.

* Book Review: Read a biology-related book (book lists can be obtained from Miss Kirk). Summarize and comment on the book.

* Research: Write a lab to solve a biology-related problem. Include ALL of the important parts to a lab report. In addition, you must also have a mentor and a public place to share your results (newspaper, letter, etc.) Include a discussion of the process and results at the end of the report.

Grading -- Grades will be assigned based on the percentage of possible points that are actually earned as follows: (A+ and D- do not exist)

A = 93-100%	B+ = 87-89%	C+ = 77-79%	D+ = 67-69%
A- = 90-92%	B = 83-86%	C = 73-76%	D = 60-66%
	B- = 80-82%	C- = 70-72%	F = < 60%

Graded assignments will include: participation (10%), tests, quizzes, and projects (50%), homework, lab reports, notebooks (30%), community service (5%), and term project (5%). (Extra credit will be offered, but may not make up more than 10% of your grade.)

Written assignments -- for full credit, all written assignments should be:

- * properly labeled (title, name, date) and formatted.
- * on time -- **latework will be accepted up to one week after the Unit Test, however there will be a penalty of up to half credit.**
- * on 8.5 inch X 11 inch ruled, 3 hole paper, not torn.
- * legibly written in pencil or ink (black or blue), or typed.

BEHAVIOR

Students are expected to exhibit behavior appropriate for OHS students -- to cooperate, participate, take responsibility, and demonstrate **RESPECT** toward others. This includes compliance with laboratory safety rules. The OHS discipline policy will be followed for students not in compliance.

CHEATING/PLAGIARISM POLICY

Any student found attempting to take credit for another's work will be dealt with per the OHS policy regarding cheating. Incorrectly grading another's assignment is cheating...both parties will be held responsible. If you see a problem while grading, please email or tell me so you will not be held responsible. Plagiarism is the theft of ideas – changing words around doesn't make it yours. Proper citation is important!!

EXTRA HELP

I am available for extra help before and after school, but please make an appointment on the appointment calendar to ensure this. I encourage you to form study groups for reviewing concepts. If you can explain the concepts to another person, then you know that you understand them.

Name and phone number of study buddy _____.

MISCELLANEOUS

Drinks in spill-proof containers are OK during classroom lessons, but **NOT DURING LABS**. Food and gum are not allowed at anytime. Personal electronics may **NOT** be used or visible during class. Violations will result in study hall. Passing time is for bathroom breaks. You will only be allowed two passes per semester to use the restrooms, so plan accordingly.

WELCOME TO BIOLOGY!!

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**GENERAL OUTLINE**

### First semester:

- \* Biochemistry (chemistry of major classes of biochemicals: carbohydrates, proteins, fats, nucleic acids, and enzymes)
- \* Ecology (ecosystems, relationships and interactions between organisms and their environment, nutrient cycles)
- \* Cells (organelles, photosynthesis, cellular respiration, mitosis)
- \* Genetics/DNA (Mendelian genetics, gene expression and regulation, population genetics, meiosis)
- \* Evolution (mechanism of and evidence for)

### Second semester:

- \* Taxonomy (levels of organization, six kingdoms, taxonomic key, binomial nomenclature, simple to complex in cell, plant, and animal groups)
- \* Monera (eubacteria, archaeobacteria, and viruses)
- \* Major kingdoms (protist, fungus, plants, animals)
- \* Nervous/Endocrine systems (nerve form and functions, nervous systems, senses, function of hormones)
- \* Body Physiology (anatomy, disease, major body systems, dissection of a fetal pig)

### Guidelines for Biology Lab Reports

Following is a rubric for many of the investigative labs this year. Not all labs will fit this format neatly, you may have to improvise. Pay attention to specific instructions for each lab.

| Student | Criteria                                                                                                                                                                                                                                                                                    |
|---------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y N     | <u>INVESTIGATIVE QUESTION</u> : General, no prediction; "How does <i>the i.v.</i> affect <u>the d.v.</u> ?" <input type="checkbox"/>                                                                                                                                                        |
| Y N     | <u>HYPOTHESIS</u> :<br>Prediction: an expected, observable outcome; "If <i>the indep. variable</i> then <u>the depend. variable</u> ..." <input type="checkbox"/>                                                                                                                           |
| Y N     | Prediction Reason: give a reason for your prediction; "...because _____." <input type="checkbox"/>                                                                                                                                                                                          |
| Y N     | <u>MATERIALS</u> : Be specific, what do you need for this experiment? <input type="checkbox"/>                                                                                                                                                                                              |
| Y N     | <u>PROCEDURES</u> :<br>Numbered and logical steps: Enough detail so that anyone could pick up your lab and perform the steps <input type="checkbox"/>                                                                                                                                       |
| Y N     | Three controlled variables: things kept the "same" throughout the entire lab <input type="checkbox"/>                                                                                                                                                                                       |
| Y N     | <i>Independent variable (manipulated)</i> : <u>one</u> changed variable <input type="checkbox"/>                                                                                                                                                                                            |
| Y N     | <i>Dependent variable (responding)</i> : <u>one</u> measured variable (what responds to the changes?) <input type="checkbox"/>                                                                                                                                                              |
| Y N     | (Experimental control: perform the lab without the influence of <i>the indep.variable.</i> ; used for comparison; insures that <i>the indep.variable</i> caused <u>the depend.variable.</u> ) <input type="checkbox"/>                                                                      |
| Y N     | Record measurements: how often are measurements "recorded"? <input type="checkbox"/>                                                                                                                                                                                                        |
| Y N     | <b>Repeated trials: more than one trial is planned to measure <u>the depend. variable</u></b> <input type="checkbox"/>                                                                                                                                                                      |
| Y N     | <b>Validity measures: to be extra confident in your results; to ensure only one <i>independ. variable</i>; to increase precision, accuracy, and reliability; an extra controlled variable not listed in materials or given by the teacher; "Be sure to _____."</b> <input type="checkbox"/> |
| Y N     | Safety requirements: check MSDS folder for any chemicals used; are there any other safety precautions that should be considered? <input type="checkbox"/>                                                                                                                                   |
| Y N     | <u>DATA</u> : Organized into a table, graph, or chart (make sure the data or drawings are properly identified with the appropriate labels and units) <input type="checkbox"/>                                                                                                               |
| Y N     | <u>CONCLUSION</u> :<br>"Based on the data": include high and low averages or data from the investigation to support your conclusion; use numbers <input type="checkbox"/>                                                                                                                   |
| Y N     | Answer the Investigative Question or describe whether your prediction/hypothesis was supported or refuted <input type="checkbox"/>                                                                                                                                                          |
| Y N     | Address concerns about the quality or validity of the investigation (be sure to address any errors or unanticipated results here) <input type="checkbox"/>                                                                                                                                  |
| Y N     | Application: how would you apply these results to a human problem? <input type="checkbox"/>                                                                                                                                                                                                 |
| 1 2 3 4 | Overall quality: Neatness, format, concise, no "it's" <input type="checkbox"/>                                                                                                                                                                                                              |
| 2       | Edited drafts <b>included</b> <input type="checkbox"/>                                                                                                                                                                                                                                      |
| 1       | _____ Grader's initials <input type="checkbox"/> <span style="float: right;">Total out of 25</span>                                                                                                                                                                                         |

### **Purpose:**

Science is a hands-on laboratory class. You will be doing many laboratory activities which require the use of hazardous chemicals. Safety in the classroom is the #1 priority for students, teachers and parents. To ensure a safe science classroom, a list of rules has been developed and provided to you in this student safety contract. They must be followed at all times. Two copies of the contract are provided. One copy is to be signed by both you and a parent/guardian. The other is to be kept in your science notebook as a constant reminder of safety rules.

### **General Guidelines:**

1. Conduct yourself in a responsible manner at all times in the laboratory.
2. Follow all written and verbal instructions carefully. If you do not understand a direction or part of the procedure, ask the instructor before proceeding.
3. Never work alone. No student may work in the laboratory without an instructor present.
4. When first entering a science room, do not touch any equipment, chemicals, or materials in the laboratory until you are instructed to do so.
5. Do not eat, drink or chew gum. Do not use laboratory glassware as containers for food or beverage.
6. Perform only those experiments authorized by your instructor. Never do anything in the laboratory that is not called for in the laboratory procedures or by your instructor. Carefully follow all directions, both written and oral. Unauthorized experiments are prohibited.
7. Be prepared for your work in the laboratory. Read all procedures thoroughly before entering the laboratory. Never fool around in the laboratory. Horseplay, practical jokes, and pranks are dangerous and prohibited.
8. Observe good housekeeping practices. Work areas should be kept clean and tidy at all times. Bring only your laboratory instructions, worksheets, and/or reports to the lab area. Other materials (books, purses, backpacks) should be stored in the classroom area.
9. Keep aisles clear and your chair pushed under your desk.
10. Know the locations and operating procedures of all the safety equipment including the first aid kit, the eye wash station, safety shower, fire extinguisher, and fire blanket. Know where the fire alarm and exits are located.
11. Always work in a well ventilated area. Use the fume hood when working with volatile substances or poisonous vapors. Never place your head into the fume hood.
12. Be alert and proceed with caution at all times in the laboratory. Notify the instructor immediately of any unsafe conditions you observe.
13. Dispose of all chemical waste properly. Never mix chemicals in sink drains. Sinks are to be used only for water and solutions designated by the instructor. Solid chemicals, metals, matches, filter paper, and all other insoluble materials are to be disposed of in proper waste containers, not in the sink. Check the label of all waste containers twice before adding your chemical waste to the container.
14. Labels and equipment instructions must be read carefully before use. Set up and use the prescribed apparatus as directed in the laboratory instructions or by your instructor.
15. Keep hands away from face, eyes, mouth, and body while using chemicals or preserved specimen. Wash your hands with soap and water after performing all experiments. Clean (with detergent), rinse, and wipe dry all work surfaces (including the sink) and apparatuses at the end of the experiment. Return all equipment clean and in working order to the proper storage area.
16. Experiments must be personally monitored at all times. You will be assigned a laboratory station at which to work. Do not wander

around the room, distract other students, or interfere with the laboratory experiments of others.

17. Students are never permitted in the science storage rooms or preparation areas unless given specific permission by their instructor.
18. Know what to do if there is a fire drill during a laboratory period; containers must be closed, gas valves turned off, fumehoods turned off, and any electrical equipment turned off.
19. Handle all living organisms used in a laboratory activity in a humane manner. Preserved biological materials are to be treated with respect and disposed of properly.
20. When using knives and other sharp instruments, always carry the points and tips pointing down. Always cut away from your body. Never try to catch falling sharp instruments. Grasp sharp instruments only by the handles.

### **Clothing:**

21. Any time chemicals, heat or glassware are used, students will wear laboratory goggles. There will be no exceptions!
22. Contact lenses should not be worn in the laboratory unless you have permission by your instructor.
23. Dress properly during laboratory activities. Long hair, dangling jewelry, and loose/baggy clothing are a hazard in the laboratory. Long hair must be tied back, and dangling jewelry and loose/baggy clothing secured. Shoes must completely cover the foot; no sandals are allowed.
24. Long pants are required for lab work and natural fibers are suggested.

### **Accidents and Injuries:**

25. Report any accidents (spill, breakage etc.) or injury (cut, burn, etc.) to the instructor immediately, no matter how trivial it may appear.
26. If you or your lab partner are hurt immediately yell out "code one, code one" to get the instructor's attention.
27. If a chemical should splash in your eyes or on your skin, immediately flush with running water from the eye wash station or safety shower for at least 20 minutes. Notify the instructor immediately. When mercury thermometers are broken, mercury must not be touched. Notify the instructor.

### **Handling Chemicals:**

28. All chemicals in the laboratory are to be considered dangerous. Do not touch, taste, or smell any chemicals unless instructed to do so. The proper technique to smell chemicals will be demonstrated.
29. Check the label on chemical bottles twice before removing any of the contents. Take only as much as you need.
30. Never return unused chemicals to their original containers.
31. Never use mouth suction to fill a pipette. Use a rubber bulb or pipette bulb.
32. When transferring reagents from one container to another, hold the containers away from your body.
33. Acids must be handled with extreme care. You will be shown the proper method for diluting strong acids. Always add acid to water, swirl or stir the solution, and be careful of the heat produced, particularly with sulfuric acid.
34. Handle flammable hazardous liquids over a pan to contain spills. Never dispense flammable liquids anywhere near a source of flame or heat.
35. Take great care when transferring acids and other chemicals from one part of the laboratory to another. Hold them securely and walk carefully.

### **Handling Glassware and Equipment:**

36. Carry glass tubing, especially long pieces, in a vertical position to minimize the likelihood of breakage or injury.

37. Never handle broken glass with your bare hands. Use a brush and a dustpan to clean up broken glass. Place broken or waste glass in the designated broken glass container.
38. Inserting and removing glass tubing from rubber stoppers can be dangerous. Always lubricate glassware (tubing, thistle tubes, thermometers, etc.) before attempting to insert it into a stopper. Always protect your hands with towels or cotton gloves when inserting glass tubing, or removing it from, a rubber stopper. If a piece of glassware becomes "frozen" in a stopper, take it to your instructor for removal.
39. Fill the wash bottles only with distilled water and use only as intended, ex. rinsing glassware, or adding water to a container.
40. When removing an electrical plug from its socket, grip the plug, not the electrical cord. Hands must be completely dry before touching an electrical switch, plug, or outlet.
41. Examine the glassware before each use. Never use chipped or cracked glassware. Never use dirty glassware.
42. Report damaged electrical equipment immediately. Look for things such as frayed cords, exposed wires, and loose connections. Do not use damaged electrical equipment.
43. If you do not understand how to use a piece of equipment, ask the instructor for help.
44. Do not immerse hot glassware in cold water, it may shatter.

**Heating Substances:**

45. Exercise extreme caution when using a gas burner. Take care that hair, clothing, and hands are a safe distance from the flame at all times. Do not put any substance into the flame unless specifically instructed to do so. Never reach over an exposed flame. Light gas (or alcohol) burners only as instructed by the teacher.
46. Never leave a lit burner unattended. Never leave anything that is being heated or is visibly reacting unattended. Always turn the burner or hot plate off when not in use.
47. You will be instructed in the proper method of heating and boiling liquids in test tubes. Do not point the open end of a test tube being heated at yourself or any one else.
48. Heated metals and glass remain hot for a long time. They should be set aside to cool and only be picked up with caution. Use tongs or heat protective gloves if necessary.
49. Never look into a container that is being heated.
50. Do not place hot apparatuses directly on the laboratory desk. Always use an insulating pad. Allow plenty of time for hot apparatuses to cool before touching.
51. When bending glass, allow time for the glass to cool before handling. Hot and cold glass have the same visual appearance. Determine if an object is hot by bringing the back of your hand close to it prior to grasping it.

**Questions:**

- Do you wear contact lenses?            yes \_\_\_ no \_\_\_
- Are you color blind?                    yes \_\_\_ no \_\_\_
- Do you have any allergies?            yes \_\_\_ no \_\_\_

If yes, please list: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Agreement:**

I, \_\_\_\_\_ (student's name) have read and agree to follow all of the safety rules set forth in this contract. I realize that I must obey these rules to ensure my own safety, and that of my fellow students and instructors. I will cooperate to the fullest extent with my instructor and fellow students to maintain a safe lab environment. I will always closely follow the oral and written instructions provided by the instructor. I am aware that any violation of this safety contract that

results in unsafe conduct in the laboratory or misbehaviour on my part, may result in being removed from the laboratory, study hall, receiving a failing grade, and/or dismissal from the course.

\_\_\_\_\_  
 Student Name (print)

\_\_\_\_\_  
 Student Signature

\_\_\_\_\_  
 Date

\_\_\_\_\_  
 Period

**Dear Parent or Guardian:**

We feel that you should be informed regarding the school's effort to create and maintain a safe science classroom/laboratory environment. With the cooperation of the instructors, parents, and students, a safety instruction program can eliminate, prevent, and correct possible hazards. You should be aware of the safety instructions your son/daughter will receive before engaging in any laboratory work. Please read the list of safety rules above. No student will be permitted to perform laboratory activities unless this contract is signed by both student and parent/guardian and is on file with the teacher. Your signature on this contract indicates that you have read this Student Safety Contract, are aware of the measures taken to insure the safety of your student in the science laboratory, and will instruct your son/daughter to uphold his/her agreement to follow these rules and procedures in the laboratory.

\_\_\_\_\_  
 Parent Name (print)

\_\_\_\_\_  
 Parent Signature

\_\_\_\_\_  
 Date

Dear Parent/Guardian,

EXTRA CREDIT

Let me introduce myself. My name is Heidi Kirk and I am your student's teacher this year. I look forward to making this an interesting and fun year, full of learning. I have found that family expectations and actions have a huge impact on the learning success of students. Helpful parents/guardians provide a quiet place and a set time for homework, monitor grade reports and homework (see [www.kirkbio.com](http://www.kirkbio.com)), and encourage thinking and reasoning about everyday events.

I would like to invite you to open house Wednesday, Sept. 21 so we can meet face to face.

I would also like you to discuss the following questions with your student and email me the answers ([hkirk@osd.wednet.edu](mailto:hkirk@osd.wednet.edu)). I will then put your address on my mass emailing list so we can better stay in touch.

Thanks,

Student name & period:

Student strengths:

Student interests:

Learning goals:

Anything unique about home life (optional):