



BIOTECHNOLOGY

Lynnwood High School

Course Syllabus (2012-2013)

1.0 Lab Science and/or CTE credit

Prerequisites:

Completion of Biology with B or better
and completion of Chemistry

MS. RUSSELL

425-431-5295

Classroom: NW-221

Email: RussellS@edmonds.wednet.edu

Website:

[http://teacher.edmonds.wednet.edu/
lhs/srussell/index.php](http://teacher.edmonds.wednet.edu/lhs/srussell/index.php)

BIOTECHNOLOGY TOPICS

SEMESTER I

- Introduction to bioethics
- Basic lab skills and safety
- Lab notebook record keeping
- Genetics Review:
 - DNA structure & function
 - Protein structure & function
 - Gene expression and regulation
 - Inheritance
- Labs: **DNA technology and analysis**
 - DNA extraction
 - DNA analysis
 - Gel electrophoresis
 - Restriction Enzymes
 - DNA microarrays (simulated)
 - Bioinformatics (computer based)-
cN3D
- Bioethics of genetic testing
- Biotechnology research papers
- Career Exploration

SEMESTER II

- Biomedical Research Process
- Drug Development & Clinical Trials
- Stem Cells science and ethics
- Infectious Disease & Immunology
- Biotechnology and the Environment
 - Genetic Engineering
 - Biotech and agriculture
 - DNA Barcoding- Research
- Labs
 - Recombinant DNA technology
 - Bacterial Transformation
 - Biomolecule purification
(chromatography techniques)
 - ELISA
 - Protein profiles w/vertical gels
 - DNA purification
 - PCR
 - DNA Sequencing (barcoding)
 - Advanced Bioinformatics
- Biotech Projects
- Career Exploration

GRADING

25%-Labs

25% Biotech Project and Papers

40% Assessments (tests/quizzes)

10% daily work.

GENERAL CLASS GUIDELINES & POLICIES

Policies in class are consistent with school policies including those related to attendance, personal electronic devices, and dress. There are additional policies specific to biotechnology to keep all students safe in a laboratory setting.

COURSE FEE

A \$20 course fee for biotechnology covers the costs of lab consumables and biotech project materials. The fee should be paid at the main office. Waivers are available for students in need. See counseling center for form and submit to main office.

COLLEGE TECH PREP

Students who earn a B or better in biotechnology, *may* earn college credit (5-quarter credits for BIOSC 110 at Shoreline Community College) through the *College Tech Prep* registration process. The college competencies are attached to this syllabus. During the (semester/year) all competencies will be covered in class. To earn college credit students are required to pass skill checks/assessments with the high school instructor. Anticipate a \$46 fee for the *College Tech Prep* registration process.

LABS AND SAFETY. Since this is a lab class, particular attention must be paid to safety. Most importantly we are concerned with your safety and the safety of others in the classroom. We are also concerned with the safety of expensive and fragile laboratory equipment. You are expected to follow all safety and lab instructions on a regular basis. **No rough play and no eating/drinking** in class or lab. A separate lab contract must be read, signed, and returned to your teacher in order to participate in labs activities.

ATTENDANCE. Daily participation is necessary for successful acquisition of essential skills and knowledge. Biotechnology uses instructional methods that require active participation from all students. Some labs cannot be made up or replicated because of very expensive, limited and/or time-sensitive resources. Likewise, students must be present to receive credit for participation in discussion oriented activities. If students are absent, they miss out on that day's learning. Absences directly impact a student's progress toward the learning goals of the course and therefore the student's grade in the course.

BIOTECHNOLOGY LABS. Many of the labs in biotechnology are either difficult or impossible to conduct in 50 minute periods. Therefore, we will occasionally extend class for 20-25 minutes beyond the 50 minute period. You cannot receive full credit for labs if you fail to attend the entire lab session. This will not occur often, but anticipate extended labs about once per month. Announcements will be made in advance. If you know of conflicts, please notify me in advance and we will work with individual situations.

- **1st Period Class:** select labs will begin at 7:00 am sharp.
- **2nd Period Class:** select labs will extend into advisory (9:10-9:35).

BIOTECHNOLOGY LAB JOURNALS. You will need to keep a journal of all the materials for this class (in a sturdy 10' x 7' composition notebook). Keep all handouts and tape them into your biology journal in the order that you receive them. You will be given additional instructions for labs, which you will keep in the second half of your composition notebook.

BIOTECH PROJECTS & PAPERS. All students will complete an independent biotechnology project. A research paper on your selected topic is required during first semester (many details to help guide and support you are forthcoming). Students will expand on the knowledge they gained from the research paper to complete a biotechnology project during second semester. Students will have two options for fulfilling this requirement.

Option A: Students can demonstrate their knowledge of their biotechnology topic by participating in the regional BioExpo Science Fair in May. Students may submit projects in the following categories: lab research, molecular modeling, art, music, multimedia, creative writing, journalism, teaching/education, or career search. Students have the opportunity to be assigned an outside mentor for their biotechnology projects. All projects will utilize the criteria and guidelines for the BIO-EXPO science fair (<http://nwabr.org/students/student-bio-expo>). Both seniors and juniors selecting this option may use this work toward their senior project. Please seek advance approval if you intend to use part or all of your biotech project toward senior project.

-OR-

Option B: Students can demonstrate their knowledge of their biotechnology topic by designing and implementing a 25 minute lesson to teach their peers in class about their selected biotechnology topic. The lesson should be interactive rather than a presentation. Mini-lessons will be held throughout second semester and students will be assigned dates for their lesson. Guidance will be provided in class.

All students will participate in a LHS Biotech Fair held during a school day in April (1st and 2nd period only). Students will showcase their year-long biotech work via a poster and an informal Q & A session.

ACADEMIC HONESTY. The expectation is that all LHS students will demonstrate integrity at all times. Using another's work and claiming it as own, even with permission, is academically unethical and is treated as plagiarism. Dishonesty, academic or otherwise, will not be tolerated. Students are expected to do their own work. ***The academic honesty policy defines cheating as (but not limited to):***

- a. Copying from a published source.
- b. Copying from another student.
- c. Letting another student copy your work.
- d. Referring to unauthorized materials during a test.
- e. Communicating during a test
- f. Acquiring a copy or information about a test before you are scheduled to receive it.
- g. Falsifying experimental data.

As per school policy, any act of plagiarism or forgery will be subject to academic and progressive disciplinary consequences up to and including Saturday school, suspension and/or removal from class with a failing grade.

MATERIALS NEEDED Each day you will need the following items:

- sturdy composition notebook
- tape
- pen/pencil
- permanent marker (i.e. Sharpie for labs).

GETTING HELP. I am available in the morning, during advisory and after school on designated days. You can contact me anytime by email (RussellS@edmonds.wednet.edu) or by phone at 425-431-5295. Please see my website for more class information and documents: <http://teacher.edmonds.wednet.edu/lhs/srussell/index.php>

LYNNWOOD HIGH SCHOOL SCIENCE LAB SAFETY AGREEMENT

The science classroom is a safe place to work if you are careful and observe the following rules.

1. Perform laboratory work only as instructed by your teacher. Ask questions if you don't understand any instructions. Failure to follow instructions could lead to serious injury or death.
2. Participate in all labs and be aware of all instructions. Many accidents in the lab occur as a result of ignorance.
3. Because the lab area is crowded, wandering around the room during labs creates an unsafe condition. All students must stay at their assigned lab station during all labs.
4. Know the location and proper use of all safety equipment in the lab (eye wash, safety shower, fire extinguisher, first aid kit, alternate exits, etc.).
5. **ABSOLUTELY NO FOOD OR DRINKS ALLOWED DURING LABS...EVER!**
6. ALWAYS WEAR GOGGLES when heating or working with chemicals.
7. Keep the lab tables clear of books, backpacks, or clothing when performing labs. **NEVER SIT ON THE LAB TABLES.**
8. Long hair should be tied back.
9. Closed-toed shoes should be worn during labs that present a danger from lab equipment or spills (i.e. no flip-flops).
10. Double check all chemicals before using them. Many chemicals have very similar names but may be very different.
11. Never taste lab chemicals (duh!). If you are instructed to smell something, use the wafting technique (fanning) that your teacher will expertly demonstrate.
12. Use electrical equipment only as instructed by your teacher. Be especially careful with plugs and liquids, since they are the cause of most classroom electrocutions.
13. Discard chemicals only as instructed by your teacher. Some chemicals cannot be put in to the sinks. **NEVER PUT SOLIDS IN THE SINK.**
14. Before leaving your lab station, clean and dry all equipment and return it to the designated location. Make sure your sink is clean and empty and wash and dry your lab tabletop. Chemicals left on equipment or tabletops are a danger to others.
15. **REPORT ALL ACCIDENTS, SPILLS AND INJURIES TO YOUR TEACHER IMMEDIATELY!**

Welcome to the 2012-2013 school year! My name is Susan Russell and I am your student's Biotechnology teacher. I am super excited to be working with your student this year! Biotechnology is an exciting field that is rapidly advancing. In class we will perform DNA analyses, genetically engineer bacteria to produce fluorescent proteins, and determine whether the foods at the grocery store have been genetically modified or not!

Students will develop proficiency with the tools and techniques used in research and medical labs and will explore the ethics associated with this rapidly progressing field. In class we will investigate a range of topics in biotechnology and biomedicine and their local and global applications and impacts. Career opportunities will be explored in class and through field trips.

- Students can earn 1.0 science and/or CTE (career technical education) credit.
- Students earning a B or better in the class are eligible to receive 5-credits from Shoreline Community College through the Tech-Prep program.
- There is a \$20 course fee for lab materials and supplies. Please submit check to 'Edmonds School District' with 'LHS Biotech fee' in the memo line.
- Your student will need the following items for this class: sturdy composition notebook, clear tape, folder with 3-metal clasps/prongs, and permanent marker (Sharpie) for labs.
- We will have several field trips throughout the year and are seeking volunteer chaperones. If you are interested please let me know.
- Daily lessons and homework are posted on the calendar under the 'EVENTS' link : (<http://teacher.edmonds.wednet.edu/lhs/srussell/index.php>).
- Please don't hesitate to contact me--RussellS@edmonds.wednet.edu



Please read over the separate Biotechnology syllabus and safety contract on reverse side. Please sign below indicating syllabus has been read and return the lower portion of slip.☺

Print:

Signature:

Student name _____

Parent/guardian _____

Parent Contact Information (phone and/or e-mail): _____

When finished, please read and complete reverse side. Please detach and return to teacher.



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LYNNWOOD HIGH SCHOOL SCIENCE LAB SAFETY AGREEMENT

I have read and agree to abide by the above safety regulations and any other printed or verbal instructions. I understand that failure to follow these regulations will result in my removal from the lab and repeat violations may result in my removal from the class.

Student name _____ Signature _____

When finished, please read and complete reverse side. Please detach and return to teacher.