



Center for Advanced Technical Studies

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Principles of Biomedical Sciences Fall 2019

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COURSE DESCRIPTION:

This course provides an introduction to the biomedical sciences through exciting hands-on projects and problems. Students investigate the human body systems and various health conditions including heart disease, diabetes, sickle-cell disease, hypercholesterolemia, and infectious diseases. They determine the factors that led to the death of a fictional person, and investigate lifestyle choices and medical treatments that might have prolonged the person's life. The activities and projects introduce students to human physiology, medicine, research processes and bioinformatics. Key biological concepts including homeostasis, metabolism, inheritance of traits, and defense against disease are embedded in the curriculum. Engineering principles including the design process, feedback loops, and the relationship of structure to function are also incorporated. This course is designed to provide an overview of all the courses in the Biomedical Sciences program and lay the scientific foundation for subsequent courses. Techniques of instruction will include lecture, hands-on projects, model building, computer programs, reports, projects, demonstrations and laboratory experiments.

This course offers the opportunity to earn dual credit. Upon completion of this course, if your grade in the course and your score on the national end-of-course assessment meet the criteria set by Project Lead the Way and partnering institutions for college credit, School District Five will automatically change the weighing on your transcript to reflect dual credit. It is the responsibility of the student to contact the partnering institution for college credit. Each post-secondary institution charges a fee for awarding of credit. The student is responsible for any costs associated with the awarding of college credit. The student is also responsible for ensuring that credits earned with transfer to the institution the student is planning to attend. The instructor of your class will provide you with specific information regarding the criteria for dual credit weighting as well as information about partnering institutions.

Enrollment in Principles of Biomedical Sciences carries the expectation that you plan to continue in the PLTW Biomedical Sciences courses, the sequence is as follows:

Semester 2: Human Body Systems (HBS)

Semester 3: Medical Interventions (MI)

Semester 4: Biomedical Innovations (BI)

MATERIALS:

3 Ring Binder

Closed Toe Shoes (must be worn daily)

Headphones

ATTENDANCE:

The Center follows the School District 5 policy for absences. Since our classes are double blocked, **each day at the Center counts as the equivalent of 2 instructional days**. Please be conservative with your absences, especially your unexcused absences. Only the Director can forgive unexcused absences. Though your home high school may offer attendance recapture options for courses taken at the home school, **there is NOT an attendance recapture option for Center classes**. Please monitor your attendance accordingly.

SCOPE & SEQUENCE

Unit One: The Mystery

- Lesson 1.1: Investigating the Scene
- Lesson 1.2: DNA Analysis
- Lesson 1.3: The Findings

Unit Two: Diabetes

- Lesson 2.1: What Is Diabetes?
- Lesson 2.2: The Science of Food
- Lesson 2.3: Life With Diabetes

Unit Three: Sickle Cell Disease

- Lesson 3.1: The Disease
- Lesson 3.2: It's In the Genes
- Lesson 3.3: Chromosomes
- Lesson 3.4: Inheritance

Unit 4: Heart Disease

- Lesson 4.1: Heart Structure
- Lesson 4.2: The Heart at Work
- Lesson 4.3: Heart Dysfunction
- Lesson 4.4: Heart Intervention

Unit 5: Infectious Disease

- Lesson 5.1: Infection

Unit 6: Post Mortem

- Lesson 6.1: Analyzing Anna

*Units of study based on the Project Lead the Way Biomedical Sciences copyrighted curriculum

GRADING SYSTEM:

The **grading system** for Lexington Richland District Five (uniform grading scale):

A	90 – 100
B	80 – 89
C	70 – 79
D	60 – 69
F	0 – 59

Major Assignments (Quizzes, Tests, Projects)

- 30 to 200 points each

- graded based on the number of points earned (determined by rubrics for individual assignments or by percentage of material correct on a test or quiz)

Daily Assignments (Daily Activities, Career journals, Homework)

- 1 to 3 points each

-graded based on the level of mastery demonstrated for the content or the skill being assessed. Points are assigned based on the following descriptors:

- 0 points – Assignment not submitted on time. No resubmit allowed if no work originally submitted.
- 1 point – Basic: Little evidence of understanding of concepts or skills submitted.
- 2 points – Proficient: Student demonstrates a general understanding of the concepts and/or skills, but still has small gaps in their understanding and performance.
- 3 points – Distinguished: Student demonstrates mastery of both the content and the skills being assessed. The work contains all required elements and is free from mistakes.

*******Certain Assignments may be resubmitted with the permission of the teacher.** The number of resubmits varies by unit. The goal is to submit your best work with your FIRST attempt; however, a limited number of exceptions can be made each grading period. This process will be explained more in class.

MISSED WORK:

Students who are absent the day homework is assigned have until the day after the assigned due date to turn the work in for full credit (For example: If you are absent on Sept. 16th, and homework is assigned during that class to be due Sept 18th, you would have until Sept 19th to turn the work in for full credit.). Students who submit work after the due date may be penalized up to 20% of the possible points and have a maximum of 5 days to turn in late work.

It is up to the student to arrange times to make-up work if they are absent for tests, labs, or quizzes. Make-up sessions should be scheduled for either before or after school and should be done immediately upon the students return. Students will be given advance notice of upcoming Tests and Quizzes, therefore students are expected to be prepared to make-up the missed test or quiz immediately upon their return.

Any student who knows they will be absent from class on a particular date (due to sports, vacations, academic activities, etc.) is still expected to hand in any work that was assigned to be due for that day. You may hand in work the day before it is due, or the morning of, but any work handed in later than the assigned class time will be counted as late.

PORTFOLIO:

You will be keeping a portfolio of all the work you do throughout your Biomedical Sciences courses. You will be given guidelines on what are the components of this portfolio. This is an excellent tool for you to use at the end of this intense curriculum to showcase all the skills and knowledge you have gained. You will turn in the portfolio as a portion of your grade.

PLAGIARISM:

The Academic Honesty Policy is being implemented to ensure that students submit credible work that is evident of their content mastery. Students should seek to be totally honest in their dealings with others. They should complete their own work and be evaluated based upon its originality. They should avoid academic dishonesty and misconduct in all its forms, including plagiarism, fabrication or falsification, cheating, and other academic misconduct.

STANDARDS:

Standards for this course are taken from *National Science Education Standards, Principles and Standards for School Mathematics, National Health Care Cluster Foundation Standards, Standards for the English Language Arts, and Standards for Technology* and are available upon request. Students will be presented their Understandings, Knowledge and Skills Objectives digitally through the course's Learning Management System.

CLASSROOM/ LABORATORY RULES:

1. **Show up on time and try not to miss!**
2. Bring all classroom materials and a **good attitude** to class with you each day.
3. **Respect** yourself, your classmates, and your school.
4. Wear your **safety equipment** at all required times.
5. Do not speak out of turn - **Raise your hand** if you would like to speak.
6. Remain in seat until the teacher dismisses you.
7. **No food, drink, candy, or gum.** You are in a lab!
8. **Cell phones** are expected to be silenced and in your book bag when you are in the classroom. You are permitted to have phones out in the hallways. Bring your phones in the building **at your own risk**. The Center does not assume responsibility for lost or stolen cell phones. It is now a **disciplinary offense** to use your cell phone to contact your parents about a problem in the classroom. If there is a problem, you are allowed to call your parents, but must use the phones in the front office – **no exceptions!**
9. **Display personal integrity at all times** – Be honest and do not plagiarize.
10. **Pull your own weight!** We will be doing a lot of group work – do your part
11. **Stay on task at all times**, even when no one is looking.

Consequences of Non-compliance

1. Verbal Warning
2. Teacher – Student Conference after Class
3. Parent notification
4. Director/Assistant Director Involvement

Immediate parent phone call or referral to Director/Assistant Director may be needed for extreme disrespect, cheating, fighting, profanity, disruptions and for alcohol/tobacco offenses.

***Due to the rigor required for advanced courses such as PLTW Biomedical Sciences, students participating in such courses may be subject to different guidelines as outlined by the teacher upon enrollment in course.

Principles of Biomedical Sciences Honors Assignments

Independent Research Project Assignments

The Biomedical Sciences program here at the Center culminates with an independent research project that makes you look like a rock star! To get you started on this project (that will be completed during the final two Biomedical Sciences courses) you will be completing 2 research related assignments this semester.

These assignments will expose you technical reading and writing and teach you more about independent research projects. You will have one major research assignment per quarter.

College Assignment

This assignment is designed to help you learn more about colleges you are interested in attending AND determining which courses you should take in high school to ensure you are prepared when you get to college. You will be asked to research one college per quarter along with your desired major.

Field Experiences and Opportunities

To enhance your coursework you will be provided with out of class opportunities within our discipline. Some of these opportunities will include biomed related field experiences specifically for honors students. These experiences may be virtual, on campus, or off campus. More information will be provided to honors students about these opportunities as dates are coordinated with partnering institutions.

There are some **MANDATORY experiences** that honors students will be required to attend. These experiences are designed to help students achieve success with their research projects. Honors students will be **REQUIRED** to attend 2 of the 4 available experiences for a GRADE. The dates for these experiences will be provided ASAP. Each experience will last about an hour.

Additional Assessment Questions

Assessments will be differentiated to meet honors level expectations. For example, tests will include additional essay questions or more analytical questions than those receiving CP credit.



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LAB SAFETY POLICIES

PREPARE FOR LABORATORY WORK

- Study laboratory procedures prior to class.
- Be aware of safety factors before beginning lab activity.
- Never perform unauthorized experiments.
- Keep your lab bench organized and free of apparel, books, and other clutter.
- Know the locations of, and how to use the safety shower, eyewash, fire blanket and first aid kit.

DRESS FOR LABORATORY WORK

- Wear closed toed shoes and lab aprons/coats during all required laboratory sessions.
- Wear safety goggles during all required laboratory sessions.
- Wear gloves when using chemicals that irritate or can be absorbed through skin.

AVOID CONTACT WITH CHEMICALS

- Never taste or "sniff" chemicals.
- Never draw materials in a pipette with your mouth.
- When heating substances in a test tube, point the mouth away from people.
- Never carry dangerous chemicals or hot equipment near other people.

AVOID HAZARDS

- Never distract another student who is performing an experiment.
No roaming during a lab. Remain at your assigned lab bench.
- Keep combustibles away from open flames.
- Use caution if handling hot glassware.
- When diluting acid, always add acid slowly to water. Never add water to acid.
- Use glycerin and twist slowly at the base when inserting glass tubing through stoppers.
- Turn off burners when not in use.
- Keep caps on reagent bottles. Never switch caps.
- Always read labels before using reagents.

CLEAN UP

- Leave laboratory bench clean and neat. Return goggles and aprons (folded) to cabinets.
- Consult teacher for proper disposal of chemicals.
- Wash hands thoroughly following experiments.

IN CASE OF ACCIDENT

- Report all accidents and spills immediately.
- Place broken glass in designated containers.
- Wash all acids and bases from your skin immediately with plenty of running water.
- If chemicals get in your eyes, wash them for at least 15 minutes with an eyewash.



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Lab Safety Agreement

I, _____, agree to: (a) Follow the teachers instructions, (b) protect my eyes, face, hands and body during laboratory, (c) conduct myself in a responsible manner at all times in the laboratory, and (d) abide by all of the safety regulations specified above. In doing so, I also realize that failure to conduct myself in a safe manner during laboratory activities will result in the forfeiture of my laboratory privileges for that day, and result in a zero for that lab report.

Student Signature _____

Date _____

Parent/Guardian Signature _____

Date _____

Syllabus Acknowledgement

I have reviewed the attached course syllabus, classroom rules, and procedures for Principles of Biomedical Sciences. I understand that I/ my child must comply with the expectations.

Student signature _____

Parent signature _____

Parent email address: _____

Parents,

Please note that the biomedical sciences courses involve the study of human anatomy. As a part of this curriculum students may be exposed to a variety of images and videos (such as surgeries and autopsies) that are appropriate for what we study, but can be somewhat graphic. If this poses an issue, please email us at jokrusen@lexrich5.org or rhowell@lexrich5.org to discuss your concerns and work out alternative assignments for your student. Thanks!