

**PLTW-Biomedical Innovations- Year Long Course (A/B Day)**

Teacher: Brooke Spells

Phone: 980-343-6011

Classroom: B104

**Office Hours: Monday & Thursday, 2:15-3:15 pm**

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**Course Description:**

In this capstone course, students apply their knowledge and skills to answer questions or solve problems related to the biomedical sciences. Students design innovative solutions for the health challenges of the 21st century as they work through progressively challenging open-ended problems, addressing topics such as clinical medicine, physiology, biomedical engineering, and public health. They have the opportunity to work on an independent project and may work with a mentor or advisor from a university, hospital, physician’s office, or industry. Throughout the course, students are expected to present their work to an adult audience that may include representatives from the local business and healthcare community.

**Prerequisites or Co-Requisites:**

Principles of Biomedical Sciences, Human Body Systems and Medical Interventions

**Textbook and Materials:**

There is no textbook required for these courses, curriculum is online. Resources students can use are Khan Academy, NOVA online and Crash Course.

• Dividers

• 3 ring binder-1 & ½ inch

• Loose leaf notebook paper

• Pens/Pencil

• Internet Access (To complete assignments if absent, curriculum is online)

• Flash drive

**Every student will need to purchase the following book from Amazon (used or new copy):**

**The Deadly Dinner Party by Jonathan A. Edlow, M.D.** 

**Grading Procedures:**

Grades will be based upon the following:

**Informal** (Class Participation, Labs, Warm ups, Classwork, Homework)-20%

 Labs are a mandatory part of this class. Laboratory reports are required on some labs.

**Formal** (Test, Quizzes, Projects, Lab report)-60%

**Midterm**-20%

**Final Exam**-20%

CMS grading scale is on a 10 point scale: A= 90-100, B= 80-89, C= 70-79, D=60-69, F= 59 and below

**Make Up Work:**

A Student who misses homework assignments or other assignments or due dates because of absences, whether excused or unexcused, will be allowed to make up the work. Arrangements for completing the work should be made **within five (5) school days** of the date of the student’s return to school and include a schedule for completion of the work. Students must initiate the contact with the teacher.

**Late work:**

1. Homework and other assignments will be accepted, even if turned in after the designated date.

2. Students will receive an initial score of **zero (0)** for an assignment or assessment on which he or she made no attempt or which is missing.

3. Credit for late work shall be awarded according to the following guidelines:

a. If the student was present in class on the due date, the work will be penalize 20 points.

b. If the student was not present in class on the due date because of an excused absence, full credit will be given for the completed work.

c. If the student was present in class on the due date because of an unexcused absence, the work will be penalized 20 points.

**Policy for Retesting:**

If a student score **below a 79**, he or she must be given the option to retake a test with a qualifier. A qualifier is a clause in the policy that must be met before the student is able to retest. Students who retest will receive the average (mean) of the 1st (original score) and the 2nd (retest score).

 **The qualifier for CTE:**

* + **You have to submit ALL missing assignments for that Unit Test.**
	+ **You have to complete two (2) sessions after school with teacher for tutoring.**
	+ **If you don’t complete all missing assignments and two (2) sessions after school you can’t retest. NO EXCEPTIONS!!**
	+ **Retest must be taken within two (2) school days of tutoring. NO EXCEPTIONS or EXTENSIONS!!**

**Rules and Procedures:**

1. All students are required to come school and be prepared for class every day (Pens, pencil, paper, projects, homework, flash drive etc).
2. Students are required to participate in class discussion and take lecture notes at times. We will do some public speaking with presenting projects.
3. Class will begin at the tardy bell, please come in and take your seat quietly and begin your warm up.
4. Please get a drink of water and go the bathroom before coming to class.
5. Please keep your area clean, pick up any paper off the floor or desk before leaving class.
6. The bell doesn’t dismiss class, I will dismiss class. Student will be allowed enough time to pack up and get ready to leave. Class will not be dismissed until everyone is seated.
7. Respect your classmates and authority. (No talking while others are talking, name calling, teasing, using profanity)
8. Please listen and follow **ALL** directions, each student and parent signed the Student Safety Contract concerning the lab. All these rules must be followed.
9. Keep your hands, feet and objects to yourself
10. **NO** cell phones, electronic devices, and earphones are allowed during class time. NO music will be allowed to be played on any electronic devices. Technology will only be used for instructional purpose, all cell phones should be kept in book bags. Book bags will be kept at the front of the class.
11. **NO** food (bottled water), gum, or candy allowed in class/lab (Any open bottles must be kept in your book bag)

**Academic Dishonesty and Plagiarism:**

Please refer to the Hawthorne Academy handbook for consequences.

**Consequences:**

Student/teacher conference

Parental contact

Referral to his/her counselor

After-school detection

ISS (In school suspension)/OSS (Out of school suspension)

**Positive Rewards:**

Student of the month (will receive warm up or homework passes)

Class Celebration

Call parent to give “positive” report

**Remind 101**

To keep you informed about classroom activities and assignments, I’m using Remind. Remind is a free service that lets me send quick messages via text, push notifications or email to everyone involved with the class. Remind will keep all phone numbers private and will allow us to stay in touch. Signing up for my messages on Remind is easy, all you need to do is provide a cell phone number or email address and I will add you to the class for your student. A place to provide your information will be at the end of the syllabus. Students have signed up for Remind, during the first week of class with cell phone number or email.

**HOSA Club**

HOSA (Health Occupation Students of America) is a national student organization recognized by the U.S. Department of Education and the Health Science Education (HSE) Division of ACTE. HOSA's two-fold mission is to promote career opportunities in the health care industry and to enhance the delivery of quality health care to all people. Hawthorne Academy of Health Science HOSA chapter will begin recruiting for the current school year in September. This is a wonderful opportunity for students to participate in volunteering, fundraising and competing at the regional, state and national level in HOSA competitive events. Information about HOSA will be located on my webpage. I am one of the advisor and contact me if you have additional questions. **National and State dues for HOSA membership are $40.00.**

**Course Topics:**

**Problem 1-Design of Effective Emergency Room**

In this problem students apply their knowledge of emergency medical careers, diagnostic testing and patient evaluation, human body systems, and medical interventions to analyze the workings of an emergency room and discuss inefficiencies that may hinder appropriate clinical care. Student teams will work collaboratively to design a more efficient emergency medicine delivery system. As students work through their designs, they will review research methods, practice effective presentation skills, and learn project management techniques.

**Problem 2-Exploring Human Physiology**

In this problem students build upon what they know about the research process in order to design, conduct, and analyze an experimental study. Students will choose a question relating to one or more body systems that they are interested in studying and will work with a team to investigate and answer that question. As students work through the experimental process, they will review and expand what they know about experimental design, collection of data, statistical analysis of data, and the presentation of data.

**Problem 3-Design of a Medical Innovation**

In this problem students review the diseases and disorders, as well as the corresponding medical interventions they have investigated in the previous courses, and propose a new or better medical device, pharmaceutical, surgical procedure, or genetic intervention. Students will work with a team to build a prototype, model, or schematic of the intervention as well as develop a marketing plan for the product. As students work through this problem, they will review the design process, complete a literature review, and further practice effective presentation skills.

**Problem 4-Investigating Environmental Health**

In this problem students will explore how substances or chemicals in the environment impact human health. Students will investigate a disease cluster in a fictional family and assess the activities of the individuals for environmental risks. Students will test water samples for the presence of contaminants that could be detrimental to human health and use molecular biology techniques to identify specific microorganisms. Students will explore the field of toxicology and design an experiment to test the effects of a particular chemical and doses of that chemical on plant growth. Students will then compile a comprehensive environmental health profile and action plan for their local area.

**Problem 5-Combating a Public Health Issue**

In this problem students draw on information they have learned in the previous courses about public health, epidemiology, and disease diagnosis to work through one of two epidemiology studies. In each study students will analyze data to define the outbreak, generate a hypothesis by diagnosing the patients’ symptoms and identifying the disease pathogen, design and analyze an epidemiological study to test the hypothesis, and outline a plan for initiating control and prevention measures. Students will then identify a local, national, or global public health crisis and write a mini- grant proposal, based on the National Institutes of Health grant structure, outlining a plan with intervention strategies. As students work through this problem, they will review evidence analysis, the design process, methodology, and analyze study data to evaluate risk.

**Problem 6-Molecular Biology in Action**

In this problem students will complete a multi-step, long-term molecular biology experiment. Students will design and work through a protocol to construct and clone recombinant DNA. They will perform DNA ligation and bacterial transformation, as well as restriction analysis of the completed plasmid. Alternatively, students will work through a more in-depth DNA cloning and sequencing project. This laboratory investigation provides students with the opportunity to isolate plant DNA, perform a ligation and bacterial transformation, purify a plasmid, submit DNA for sequencing, and present all work to GenBank, the NIH genetic sequence database, for publication. As students work through either of these projects, they will learn new laboratory skills, practice laboratory troubleshooting techniques, and review proper protocol for research notebook documentation.

**Problem 7-Forensic Autopsy**

In this problem students will work as medical experts to work through mysterious death cases. First, as forensic pathologists, students will examine a fetal pig using the same protocol as a human autopsy. Second, students will draw on information they have learned in the previous courses about human body systems to design a fictional death case. Students will showcase the clues left behind in the body and tell the story of how the person died through medical documents, including an autopsy report and medical history forms. Students will finally be tasked with solving another group’s proposed case.

I have read and understood the above course syllabus, for PLTW-Human Body System. Parents, if you would like to sign up for Remind, check the box:\_\_\_\_\_\_\_\_ Yes \_\_\_\_\_\_\_\_\_ No

 Student Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 Student signature and date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Parent(s)/Guardian signature and date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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