**Biomedical Innovations**

**Instructor:** Mrs. Marty Warren

**Instructor Contact Information:** warrenm@jenningsk12.org

**Instructor Availability:** Mondays and Wednesdays 3:00 pm to 3:30 pm or by appointment

**Room #: S118**

**Textbook:** Project Lead the Way Biomedical Innovations Online Site and Materials Distributed by Instructor

**Course Description**

In the final course of the PLTW Biomedical Science sequence, students build on the knowledge

and skills gained from previous courses to design innovative solutions for the most pressing

health challenges of the 21st century. Students address topics ranging from public health and

biomedical engineering to clinical medicine and physiology. They have the opportunity to work

on an independent design project with a mentor or advisor from a university, medical facility, or

research institution.

**Goals for Student Learning**

**Independent Project** Students will be required to complete an Independent Project during the

course. Thorough instructions and some class time will be afforded, but the majority of the

project will be completed outside of class. The project will have required portions due during

each quarter of the school year. Students must complete and present their Independent Project.

**Problem 1: Design of an 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.

**Unit 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: 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.

**Textbook and Materials**

• *1.5 to 2 inch Binder & Paper*

• *Colored Pencils*

• *Lab Gloves*

• *Pens/Pencils*

**Grading Policy**

**Examples of Product, Process, and Practice**

**PRODUCT (50%)**

*Culminating Demonstration*

*of Knowledge*

**PROCESS (30%)**

*Addressing Specific*

*Short-Term*

*Learning Outcomes*

**PRACTICE (20%)**

*Building Attitudes,*

*Habits, and Skills*

Does it measure how well students achieved specific learning goals, standards, and/or

competencies?

Does it provide feedback to students regarding growth towards the attainment of specific learning goals, standards and competencies?

Does it allow students to practice skills and/or reinforce content learning?

**Classroom Rules and Procedures**

*Dissections:* There is a participation grade associated with the dissections. The animals used in

this class are to be treated with respect and care. Any cruelty to these animals will result in a zero

for the participation grade of that dissection and you will be excluded from all future dissections.

*Collaboration:* A large portion of this course is collaborative, which means you will be working

with your classmates. You will be responsible for not only the content of an assignment, but for

the effective function of your group. If you have issues with your group or its function at any

time, you must see Ms. Warren immediately to develop a resolution. **Issues with groups that are**

**brought up on or near due dates, after projects are handed in, or after grades are given will**

**not be addressed!**

*Projects:* The foundation of Biomedical Innovation is the projects (or tasks) that you complete at

the end of each problem. These projects are incredibly important as they demonstrate your

understanding and comprehension of all of the work you will have completed to that point.

Please understand that, because of the size and intricacy of the projects and the large amount of

time spent on their completion, they will comprise a very large portion of your grade. Plan

accordingly, work to the absolute best of your ability, and be sure to carefully follow instructions

and rubrics when completing these projects.

*Assignment Submissions:* Assignments will be turned in almost exclusively as digital versions. It

is imperative that instructions for turn-in procedures are followed precisely. If an assignment is

completed on time as demonstrated by time-stamped evidence, but was turned it in late or

improperly (e.g. incorrect naming conventions, incorrect file formats, incorrect turn-in

locations), a 10% deduction will be taken from the grade achieved. This policy applies to

individual and group assignments.

**REQUIRED MATERIALS:**

Notebook and a dedicated folder for this class

5 binder dividers

Pencils/Pens/Hi-lighters

Other supplies as needed per activities/laboratory exercises

**METHODS OF INSTRUCTION:**

Lecture/Discussion

Multimedia/Audiovisual (PowerPoint, DVD, Videos)

Individual reading and work

Demonstration/Return Demonstration

Classroom/Group interactive activities

Role play/Simulation

Student presentation

Laboratory work

**In this class, we will be doing a few things consistently to support your overall academic development.** Two things that will be implemented regularly are:

* Close-Reading with Annotation
* Writing use Claim, Evidence, and Reasoning model

**EVALUATION:**

|  |  |  |
| --- | --- | --- |
| **Course Work** | **Percentage** | **Types of Assignments** |
| Major | 85% | **Assessments:** Projects, research, presentations, written assignments and proposals, problem resolution and implementation |
| Daily | 15% | **Daily work:** Unit activities, Lab note book/ lab, Conclusion questions, Career Journal, Participation |

**Grading Policy: A = 90-100; B = 80-89; C = 70-79; D = 60-69; F = 0-59**

**ATTENDANCE:**

* **TARDY** – A tardy is failure by a student to be in the classroom when the session has started. After missing the first ten minutes of class, the student will be counted absent.
* **MAKE-UP WORK DUE TO ABSENCE** - ***This is the student’s responsibility!***
  + **Pre-arranged –** Student needs to meet with the teacher prior to the absence to obtain and or complete work they will miss.
  + **After an absence –** Student needs to check with teacher about missing work.
  + **Late assignments**/**Late lab assignments**– You can expect a letter deduction for each day a missing assignment has not been turned in. Missing work **will not** be accepted for grading after the end of each quarter.

**WHAT TO DO IF YOU HAVE BEEN ABSENT**

YOU ARE RESPONSIBLE FOR FINDING OUT WHAT YOU MISSED WHEN ABSENT!!!

1. Copy down the notes from the days you were absent from a reliable student. This should be taken care of either before or after class, not during class.

2. Check Google Classroom and the assigned PLTW Unit for the missed class to see what assignments you missed. You will have three days from the day you return to get these completed.

3. Turn in any assignments that were due while you were absent.

4. Check the “Out Box” to see what papers were returned while you were gone.

5. Check the file folders for any handouts that were given in your absence.

6. Since ample notice is given of upcoming tests, you will be expected to take any test you missed on the day you return unless the absence has been extended.

7. See Ms. Warren if you have any questions or need clarification on missed assignments.

**RETAKE POLICY:**

* Retakes will be allowed for ONLY failed assessments.
* Retakes will be allowed ONCE per failed assessment.
* The highest points possible on a retaken assessment will be 75%, or a “C”.
* NO retakes on daily work will be allowed.
* Retakes on assessments must be completed within the quarter they were originally administered.

**CLASSROOM RULES & EXPECTATIONS:**

1. Be respectful, responsible, and safe to fellow students, staff, and substitute staff.
2. Be on time and come prepared to learn.
3. Ask for help when needed and maximize your learning time.
4. Class participation is an expectation.
5. Cell phones may not be used during class, unless directed by the teacher for specific educational purposes.
6. Please do not eat in class unless specifically allowed to do so by the instructor. Water in PLASTIC containers is allowed. All other types of drinks will be allowed at the discretion of the instructor.

**LABORATORY RULES & EXPECTATIONS:**

**SAFETY IS IMPORTANT! WE ALL MUST FOLLOW THE FOLLOWING RULES IN ORDER TO HAVE A SAFE AND PRODUCTIVE LABORATORY EXPERIENCE!**

**STUDENTS ARE EXPECTED TO PUT ON SAFETY ATTIRE *BEFORE* STARTING THE LABORATORY EXPERIMENT/INVESTIGATION**

1. Closed-toed shoes are required by everyone in the laboratory. No slides, shower shoes, slippers, etc. Please wear the proper shoes on “LAB DAYS.”
2. Long hair/braids must be tied back.
3. Lab aprons/coats must be worn during lab to protect your clothing and yourself from any spills, splashes, and so forth.
4. Long sleeves should be rolled up to prevent accidents.
5. Safety glasses/goggles should be worn during the ***ENTIRE*** time you are in the lab. There may be a time when you may need a break from your goggles/glasses. The instructor will guide you to a designated area where you may “take a break” from your safety glasses/goggles.
6. Gloves are to be worn during specific labs as required by the instructor.
7. Please ***DO NOT EAT*** or ***DRINK*** in the lab! If you break this rule, you will be assigned an “F” for each section of the lab exercise!
8. ***NO GUM, MINTS***, or ***HARD CANDY*** in your mouth while in the lab. If you break this rule, you will be assigned an “F” for each section of the lab exercise!
9. All pre-lab assignments ***MUST*** be completed ***PRIOR*** to the laboratory exercise. Failure to do so will forfeit participation in the lab and student will be assigned a grade of ***ZERO*** for ***all*** sections of that lab.
10. All pre-lab setup ***MUST*** be completed at least one day before the laboratory exercise. Failure to do so will forfeit participation in the lab and student will be assigned a grade of ***ZERO*** for ***all*** sections of that lab.
11. All lab assignments must be turned in on time. Late assignments **WILL NOT BE ACCEPTED!**
12. Be respectful, responsible, and safe to fellow students, staff, and substitute staff.
13. Be on time and come prepared to learn.
14. Ask for help when needed and maximize your learning time.
15. Laboratory experiment participation is an expectation.
16. Cell phones may not be used during lab, unless directed by the teacher for specific educational purposes.
17. All purses, bags, and other notebooks will be kept in the classroom under lock and key, **OR** they may be stowed behind the teacher’s lab bench in the lab on lab days.