Course Description: Students investigate human body systems and health conditions including heart disease, diabetes, sickle cell disease, hypercholesterolemia, and infectious diseases. They determine factors that led to the death of a fictional person and investigate lifestyle choices and medical treatments that might have prolonged their life. Activities and projects introduce students to human physiology, medicine, research and bioinformatics. This is the first year of the Project Lead the Way (PLTW) biomedical science sequence. This class is cross credited for CTE and Science. Students are encouraged to participate in HOSA.

Objectives:
✓ Investigate biology (biochemistry, cells, cell processes, and inheritance) using scientific methods
✓ Propose and design logical and practical solutions to real-world, biological problems
✓ Properly research, prepare, and source formal lab reports and design proposals
✓ Investigate careers in biology
✓ Develop and practice public-speaking skills through presentations and demonstrations
✓ Consistently practice 21st Century Skills (critical thinking, collaboration, communication, creativity)
✓ Use traditional and alternative methods of studying science
✓ Demonstrate mastery of the above objectives through varied assessment (written and practical)
✓ Create a portfolio of accumulated 1st semester knowledge to help prepare for the course EoC

Units of Study:
The Principles of the Biomedical Sciences (PBS) course is divided into six units designed to introduce students to the study of the human body and human medicine. The following is a description of each unit in the PBS course.

Unit 1 – The Mystery
Unit one provides the foundation and develops the theme for the course. Students are engaged by reading about a woman, Anna Garcia, who is found dead in her home. Students investigate the scene, gather evidence and then move to the lab to analyze their findings. Through their examination of key evidence, students learn notebook organization, observation and documentation skills, and well as the fundamentals of experimental design. Students are introduced to the structure of DNA and investigate how basic molecular biology techniques can be used to connect suspects with a crime scene. Students

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also discuss the bioethics of scientific research and explore the bounds of HIPAA legislation. In each unit of the course, students obtain additional medical history information for Anna as well as details from her autopsy report as they explore the various illnesses she encountered throughout her life. Students will maintain a medical file for Anna Garcia, compile their ideas and findings over the duration of the course, and ultimately determine her cause of death in the final unit.

Unit 2 – Diabetes
Students walk through Anna Garcia’s diagnosis of diabetes by completing simulated laboratory tests. Given results of the tests, students can deduce the basic biology of both Type 1 and Type 2 diabetes. Students investigate the connection between insulin and glucose and discuss how feedback systems in the body regulate the function of key hormones. Students investigate the biochemical makeup of food and complete experiments to demonstrate the relationship between energy and food. As students explore diabetes, they are introduced to basic chemistry, the structure and function of macromolecules, and the relationship of these molecules to metabolic function. The causes, symptoms, treatments and side effects of diabetes are studied as well as the lifestyle implications associated with this disease. Students examine complications related to diabetes and finally brainstorm and develop an innovation to help with the management or treatment of the disease.

Unit 3 – Sickle Cell Disease
Students learn basic concepts of genetics and inheritance as they explore Anna Garcia’s struggle with sickle cell disease. Students examine sickled red blood cells under a microscope and learn what life is like with the disease by reading and writing patient diary entries. They simulate the process of protein synthesis, examine the assembly of the protein hemoglobin, and demonstrate how sickle cell disease results from a mutation that alters a protein product. Students create chromosomes spreads, examine the structure of chromosomes, and show how traits are passed through generations on these chromosomes in our cells.

Unit 4 – Heart Disease
Students examine the normal function of the human heart and investigate malfunctions in the cardiovascular system that can lead to heart disease. Students complete a dissection to tour heart anatomy and study heart function using probes and data acquisition software. They collect and analyze heart data including heart rate, blood pressure, and EKG readings and analyze cardiac test results of Anna Garcia. Students explore the role cholesterol plays in the body. Students further their knowledge of molecular biology as they run gel electrophoresis and complete RFLP analysis to diagnose familial hypercholesterolemia. Students design models to simulate the function of a pump and design visuals to show interventions for blocked coronary vessels.

Unit 5 – Infectious Disease
Students follow the spread of a simulated epidemic as engagement to a thorough examination of the agents of disease. Students use clues from their investigation of Anna Garcia’s medical history to deduce that she was suffering from a bacterial infection. Through a series of laboratory investigations, students learn the fundamentals of aseptic technique, complete visual identification of bacterial morphology, use the Gram stain to examine bacterial cell structure, and run metabolic tests to pinpoint the particular bacterium at the heart of the illness. Students explain the functioning of the human immune system in a visual project and explore how this system is designed to protect against invaders.

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Unit 6 – Post Mortem
In the final unit of the course, students put together all they have learned throughout the course to determine Anna Garcia’s cause of death. Students will investigate the structure and function of key human body systems and relate the illnesses in the course to a breakdown in these systems. Students will begin to recognize the coordination and interconnections of the body systems required to maintain homeostasis, a precursor to the theme of the Human Body Systems course.

Class Text, Materials, and/or Equipment:

Students must provide:
- 3 Ring binder with 5 dividers
- Filler paper for 3 ring binder
- Pencil
- Pen (blue or black ink)
- Non-graphing calculator
- Highlighters
- Additional colored pens (optional)
- Dry Erase white board markers (optional)

Grading Policy:
Points are weighted to develop the student’s total score. I have broken up my grading into two parts, Major grades and Minor grades.

Major Grades - 60% of student’s grade: Student Understanding
This includes Tests, quizzes, and any major projects

Minor Grades – 40% of student’s grade: Student Effort
This includes classwork, homework, labs and notebook checks

Grading Scale:

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<td>90 to &lt;94%</td>
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Late/Make-Up Work Policy:
Poor attendance will affect the grade a student earns in my classes.
Excessive absences or unexcused absences is a cause for disciplinary action and / or suspension, this is also located in your student handbook. Some lab activities can simply not be made up if absent! Make

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up assignments missed due to absences promptly. You can find out what you missed by asking your lab partner and referring to your Teams folder. This is YOUR responsibility, not mine. If your absence is excused, then you have the same amount of days you were absent to make the work up. It is the student’s responsibility to make up any labs or activities by communicating with Ms. Weisbeck.

Classroom Expectations:
- NO EATING OR DRINKING IN THE CLASSROOM/LAB AREA. However, water is allowed, but must be stored away from lab stations and computers.
- No one may leave the classroom five minutes before or after the bell.
- Appropriate classroom behavior and language is expected at ALL TIMES. You are responsible for your actions and should remember to respect yourself, our class community and the classroom itself. Make good choices! Any behavior/language that is unsafe or prevents learning will be handled with administrative consequences.

Building Hall Pass Policy: In the event that you need to leave the classroom, you must take the classroom hall pass or the pass delivered to you from the main and/or counseling office. Keep the pass with you until you return to class.

Attendance and Tardy Policy: Be to class on time and prepared to learn. Tardies/unexcused absences will result in progressive discipline from the administrators. If you are tardy 3 or more times to my class you will receive detention. Please note: if you enter the classroom more than 10 minutes late, it is an unexcused absence.

Personal Device/Technology Policy:
The use of electronic equipment is only allowed in class when instructed to do so by me. This includes cell phones or personal devices etc…. If you are using one in class for purposes other than research, I will ask the student to put their phone in the Phone Spa in my classroom. Students have the option of placing their phone in the Spa at the beginning of class in order to avoid distractions and participate fully in the class. Please see student handbook for electronic violation progressive discipline.

Honor Code and Academic Integrity:
Do your own work. Cheating and/or plagiarism will result in a zero for the assignment/test-whether you do it or some on else copies your work. There will also be further administrative consequences.

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