PLTW: Principles of Biomedical Sciences: 2017-2018 *Instructor: E. Walsh--Room 407*

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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.

Sequence of Topics

The Principles of the Biomedical Sciences (PBS) course is divided into six units designed to introduce students to the study of human biology and 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 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 life style 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.

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.

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Supplies

The following supplies are required for this course:

- 1 3-ring binder ***w/ pockets*** (1 inch minimum)
- 5 dividers
- 2 composition books (non-removable pages!)
- Blue or black pens
- Loose-leaf paper

Standards and Grading

Students will be given several opportunities to demonstrate their mastery of the content in this course. A student's grade in the course is determined by examining the evidence of their growth toward meeting each of the following standards:

- Inheritance and Variation of Traits
- Diseases and Disorders
- Human Structure and Function
- Medical Mathematics
- Career Decision Making
- Concepts of Effective Communication

Student learning activities will fall into two categories: **Preparation** and **Performance.** Preparation activities are those done in and out of the classroom over the course of a unit to prepare the student to show mastery of objectives (i.e. homework, quizzes, warm-ups). Performance activities are those done in and out of the classroom intended to show student mastery of objectives (i.e. tests, projects, lab reports).

Evidence submitted by students will be evaluated against the standards and given a rating of

Advanced-Exhibits exceptional mastery of the course objectives
Proficient-Displays good mastery of the course objectives
Basic- Provides evidence of beginning mastery of course objectives
Minimal-Provides no evidence of mastery of course objectives

These ratings will be converted to a numeric value and translated into the traditional A, B, C, D, U grades for progress reports.

Standard Level	GPA Point Scale	% Represented in Infinite Campus	Traditional Letter Grade
AD (Advanced)	4	100 (90-100)	A
PR (Proficient)	3	85 (70-89)	80-89=B 70-79=C
BA (Basic)	2	65 (51-69)	D
MI (Minimal)	1	50 (1-50)	U
0 (No evidence)	0	0	U

Students will have the opportunity to make revisions to evidence or attempt a replacement evidence piece to improve their achievement levels. The steps involved in this process include:

1. Examining the feedback given on the original work.
2. Incorporating the feedback into an improved product.
3. Conferencing with the teacher regarding the progressing work.

**Lab reports must be resubmitted within 5 days of the original work being returned.
**The deadline for all other retakes and resubmits is one week prior to the close of grades.

Extra Help

It is essential that students study daily in order to perform well in this class. It is important to get clarification of difficult concepts as we go along, rather than waiting until right before a test. Do not wait until you are struggling to ask for help. Student Support is available in Science

Tuesdays 2:55-3:25
Thursdays 2:55-3:45

Assignments

All assignments should reflect the best effort of the student and should be the individual's own work. Assignments must be typed or completed in blue or black ink on loose-leaf paper. Students should place their heading in the upper right corner of the paper. The heading includes full name, date (spelled out!), class and period. The title of the assignment should be written on the top line of the paper.

Final Assessments

A cumulative final assessment will be given at the end of each semester. All students are expected to participate in this assessment.

1. No exemptions are granted for the first semester.
2. In the second semester, all students will take the PLTW End of Course Assessment.

Cell Phone Policy

Electronic devices may not be used during class. Electronics should be turned off and put away upon entering class. Due to the unfortunate rise in electronics-facilitated cheating, cell phones are forbidden while students are taking a test. All students must surrender their cell phones upon entering the classroom for a test. Phones will be kept secure and returned after the test. Any student found in possession of a cell phone during a test will receive an automatic zero on the test.

Classroom Expectations

Students are expected to be seated, working on the daily warm-up before the bell rings to begin class.

Students who are late to class are expected to have a legitimate pass.

Students are strongly encouraged to be in class every day. The interactive nature of a science class makes it difficult to make up after an absence.

Students are responsible for making up any work missed during an excused absence. Work missed during an unexcused absence cannot be made up.

Students will not be given permission to leave the classroom once class has begun. All personal business, including using the restroom and going to lockers should be taken care of prior to class.

Students will be permitted to have one "emergency" hall pass per quarter. Unused hall passes do not carry over to the next quarter.

For safety reasons, **students are not permitted to chew gum, eat or drink in science classrooms**. Plastic water bottles are permitted.

Students are expected to abide by all laboratory safety rules. Failure to do so will result in removal from the lab. Student will not be permitted to make up the lab.

Failure to meet these expectations will be reflected in the student's Citizenship grade and may result in disciplinary action.

RUHS Citizenship Rubric

To earn a RESPECT CITIZENSHIP grade you must meet 3 or more criteria in one number band.

	Be Responsible	Be RespectfUl	HonorAcademics	Be Safe
4	*Always* • *on time to class* • *phones, electronics are off and unseen* • *food and drinks are not present during class (except water)*	*Always* • *respectful of staff, students and school property* • *uses appropriate language* • *demonstrates appropriate school behavior*	*Always* • *prepared for class* • *participates* • *on task* • *works to potential* • *demonstrates academic integrity*	*Always* • *follows school and classroom rules* • *follows staff directives* • *secures personal belongings* • *follows dress code*
3	*Consistently* • *on time to class* • *phones, electronics are off and unseen* • *food and drinks are not present during class (except water)*	*Consistently* • *respectful of staff, students and school property* • *uses appropriate language* • *demonstrates appropriate school behavior*	*Consistently* • *prepared for class* • *participates* • *on task* • *works to potential* • *demonstrates academic integrity*	*Consistently* • *follows school and classroom rules* • *follows staff directives* • *secures personal belongings* • *follows dress code*
2	*Occasionally* • *on time to class* • *phones, electronics are off and unseen* • *food and drinks are not present during class (except water)*	*Occasionally* • *respectful of staff, students and school property* • *uses appropriate language demonstrates appropriate school behavior*	*Occasionally* • *prepared for class* • *participates* • *on task* • *works to potential* • *demonstrates academic integrity*	*Occasionally* • *follows school and classroom rules* • *follows staff directives* • *secures personal belongings* • *follows dress code*
1	*Rarely* • *on time to class* • *phones, electronics are off and unseen* • *food and drinks are not present during class (except water)*	*Rarely* • *respectful of staff, students and school property* • *uses appropriate language* • *demonstrates appropriate school behavior*	*Rarely* • *prepared for class* • *participates* • *on task* • *works to potential* • *demonstrates academic integrity*	*Rarely* • *follows school and classroom rules* • *follows staff directives* • *secures personal belongings* • *follows dress code*

Discipline Policy

Students are expected to follow the school and class rules at all times. Chronic or serious infractions will result in referral to an administrator and a parent contact. Minor infractions will result in:

1. A verbal warning
2. A written warning
3. A 15 minute detention to be served within 24 hours (before or after school)
4. A 30 minute detention to be served after school

What to Do if You've Been Absent

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

1. Borrow a reliable student's notebook, and copy down the notes and warm-up from the days you were absent. This should be taken care of either before or after class, not during class.
2. Check Google Classroom 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. If there is a quiz on the day you return, you must take it, but you may write "absent" on the top of your paper, and it will be graded accordingly.
7. 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.
8. Make an appointment to see Ms. Walsh if you have any questions or need clarification on an assignment.

School Wide Literacy Focus

Riverside will be using a universal strategy to improve reading and writing for all students this year. We will use close reading with annotation and using evidence to support arguments in writing. In addition, we will implement the use of Achieve 3000 in science classes to further improve reading skills.

How to Stay in Touch

1. Join REMIND. I send out reminders and announcements via this service. To join, send this text message: **@PBSWalsh** to the number **81010**. You can also text me privately through this service.
2. Email: **walshek@milwaukee.k12.wi.us** I check email often so it is very efficient to get in touch with me this way. If you are emailing from a non-MPS email, please be sure to identify yourself.
3. Phone: I can also be reached by leaving a voicemail at **906-5175**. I will answer all voicemail messages within 24 hours.

PRINCIPLES OF BIOMEDICAL SCIENCE SYLLABUS AGREEMENT

Notice to Students

You are expected to keep this syllabus in your class notebook and refer to it as needed. Ignorance of the contents of this syllabus is not an acceptable excuse. These are the policies and procedures by which this class will operate. It is important that you are knowledgeable about what I will expect of you. Please sign below indicating your agreement to be held to these expectations.

_____
Student Name (Print!)

_____ _____
Student Signature Date

Notice to Parents

Your role as a partner in the education of your child is very important. Please sign below indicating that you will assist in holding your student to the expectations detailed in this syllabus.

_____
Parent Name (Print!)

_____ _____
Parent Signature Date

_____
Phone Number

_____
Email (Please PRINT carefully!)