2025-2026
PROJECT LEAD THE WAY: PRINCIPLES OF BIOMEDICAL SCIENCE

Teacher Name: Mrs. Katie Collins
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Course Description:

This course provides an introduction to the biomedical sciences through exciting hands-on projects and problems. Students investigate concepts of biology and medicine as they explore health conditions and take on roles of different medical professionals to solve real-world problems. Throughout the course, students are challenged in various scenarios including investigating a crime scene to solve a mystery, diagnosing and proposing treatment to patients in a family medical practice, to tracking down and containing a medical outbreak at a local hospital, stabilizing a patient during an emergency, and collaborating with others to design solutions to local and global medical problems.

Course Objectives:

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Unit 1: Medical Investigation - In Unit 1 students engage in forensic science and medical examination investigations to explore biological and forensic science careers and gain experience in experimental design and data analysis. Through the investigation of a mysterious death, students learn about:
Biomolecules and their role in determining identity
Human anatomy and physiology
Interconnectedness of systems

Unit 1 will include the Anchor Assignments for embedded numeracy, literacy and science.

-Essential Questions:
1) What are different forms of evidence, how infallible are they, and how are they useful in resolving potential criminal cases?
2) How can varying forms of evidence be evaluated for meaning?
3) How does technology help bring resolution to forensic cases? Or how does technology advance the understandings in forensic science?
4) How can the cause, mechanism, and manner of death be established?
5) What information can be collected from an autopsy?
6) How can information collected during an autopsy lead to an understanding of disease and/or cause of death?
7) In what ways are the careful evaluation of evidence and accurate recording of data critical to establishing legitimate testimony?
8) How can individual pieces of evidence, evaluated against the whole, be used to resolve questions?

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9) In what ways can scientific writings and presentations be utilized to present evidence and justify conclusions?
10) To what extent can current understandings be reinforced through practice?

Unit 2: Clinical Care -Students assume the role of different medical professionals working through the schedule of patients in a family care clinic. Over the course of the unit, students:
Explore medical careers
Practice professional communication
Gain experience collecting, recording, and interpreting physiological data
Learn how to perform routine medical tests and evaluate results
While "meeting" with patients, the interconnectedness between body systems is reinforced, and students explore the various causations and inheritance of disease. Students are exposed to cutting-edge technologies that are revolutionizing health care and will evaluate their impact.

-Essential Questions:

1) How can an individual's health status be assessed and evaluated?
2) What factors make an individual more susceptible to disease?
3) What are strategies for maintaining health?
4) What are effective means of communicating with others in order to reach common goals?
5) What qualities make for an effective medical professional?
6) In what ways, and for what purpose, can patient confidentiality be maintained?
7) How can changes in a genome lead to disease?
8) Why is an understanding of heredity an important factor in human health?
9) In what ways are genetic changes acquired?
10) In what ways can altered biological processes lead to disease?
11) How can the genetic health of an individual be evaluated?

Unit 3: Outbreaks and Emergencies (Weeks 1-7) -Working as public health officials and then as emergency responders, students are presented a series of events they must address while exploring careers in epidemiology, public health, microbiology, and emergency medicine. Students have opportunities to develop their professional communication and presentation skills. Key skills highlighted include data analysis, medical decision-making, patient diagnosis, identification of agents of disease, first aid, triage, and strategies involved in disaster preparedness and response.
-Essential Questions:
1) In what ways, and for what purpose, can microorganisms be characterized?
2) What factors affect the growth and death of microorganisms?
3) What are effective strategies for preventing and treating disease?
4) How does an immune system identify and eradicate infection?
5) How can pieces of evidence be evaluated to form conclusions and inform decisions?
6) How can an individual's health status be assessed and evaluated?
7) How is patient case information summarized and communicated efficiently?

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8) What professions respond in emergency situations, what are their roles, and how do they work together?
9) What are several career paths in the field of emergency medicine?
10) How do patient vitals and presumptive diagnoses inform the prioritization for treatment options in emergency medical situations?
11) What make for effective emergency and disaster response protocols?
12) How do medical professionals manage emergencies that involve multiple patients?
13) To respond to emergency situations, what common medical resources and facilities need to be available?
14) What are features of a user-friendly app?
15) In what ways can technology enable a faster response and quicker resolution during medical emergencies?

Unit 4: Innovation Inc. (Weeks 7-14) –Welcome to PLTW Innovation, Inc., an incubator for innovation where some of the best minds in science and engineering endeavor to solve some of the world's most pressing biomedical challenges. Students tour PLTW Innovation, Inc. labs and engage in experiences designed to build their engineering and experimental design process skills and to create solutions to current and emerging issues both on and off this earth. Students will build their computer science skills by using computer-aided design (CAD) and geographic information system (GIS) and unite these skills with their science and engineering experiences to innovate the future of medicine. This unit demonstrates that solutions to biomedical science problems rely on collaboration between professions.

Essential Questions:
1) How do the engineering and experimental design processes enable innovation?
2) Who innovates, and why?
3) What is the process for innovation and what personal characteristics are required for success?
4) How do innovations impact and advance human health?
5) How does technology function as a vehicle for innovation?
6) In what ways do different types of scientists and engineers collaborate in the biomedical sciences field?
7) What are potential untapped resources that could work to advance the field of biomedical sciences?

Classroom Expectations:

You are expected to conduct yourself in a respectful and productive manner. In addition to all the rules and expectations listed in the student handbook, I expect you to have a positive attitude, treat others with respect, practice self-discipline, and demonstrate responsibility. If

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these conditions are not met, you can expect one-on-one meetings with me, parent/instructor conferencing, and administrative action, if necessary.

Cell Phone Expectations

ALL electronic devices are prohibited to be used during the instructional day. This is from 8:12-3:28. This includes: cell phones, smart watches, earbuds/headphones/airpods, tablets, and personal computers (school issues laptops will be allowed). Discipline will be given to ANY student who uses an electronic device. If you bring your device to school, it MUST be placed in your bookbag. It cannot be on your person.

Tardy Policy

Students late to ANY class, without a pass, will report to a tardy scanning station. You will input your identification number on the pin pad. A tardy slip will be printed for you to report to class. Parent email will be sent for every tardy. Discipline will be as follows: 3 total tardies will result in 1 day of ISS; 6 total tardies will result in 2 days of ISS;
Progressive discipline to follow.

Grading Policy:

Grades are based on a 100 point scale. We have two types of grades: daily grades (30% of final grade) and tests (70% of final grade). The percentage based grading scale is as follows: A (90-100), B (80-89), C (70-79), D (65-69), and F (below 65). Grades will be a reflection of mastery of the standards. Make sure all absences are excused as class work can be made up and graded for excused absences only.

Cheating/plagiarizing will be handled by the teacher at teacher discretion.

Exam Exemption Policy

Any student in grades 9-12 are eligible to earn an exam exemption for the 2025-2026 Exams for each class IF they have earned an 85% or higher as the final grade for that course. Any of the following will EXCLUDE a student from exempting for that class:

- **More than five EXCUSED absences**
- **Any UNEXCUSED absence**
- **In School Suspension (ISS) for 3 days or more**
- **Out of School Suspension (OSS)**
- **One or more days of Alternative School placement**
- **Not participating in the state standardized assessment for their grade level (10th PreACT, 11th ACT with Writing, 12th WorkKeys, and AP exams)**

Attendance and full participation in reviews and assignments for the class leading up to the day of the final exam are required.

BOB JONES HIGH SCHOOL
PREPARING TODAY FOR THE CHALLENGES OF TOMORROW

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Make-up Work Policy:

Attendance is crucial for success in PBS as most of the work will be done in class and many of the activities are difficult to make up.
It is the **student's** responsibility to collect assignments that are missed during an absence from Schoology, another student, or by contacting the teacher. **Students have the same number of days they were absent to make up an assignment/activity.** Note: Certain lab activities cannot be made up due to logistical issues, and students will be given a possible alternate assignment to replace the lab grade.

Tests & quizzes that are missed will be completed outside of instructional/activity time. Please talk to me to set up a time to make up your assignment during Patriot Prep. It is the **student's** responsibility to set up a time and make up their test or quiz.

Text and Other Required Reading:

No textbook required. The curriculum is provided through Project Lead the Way.

18 WEEK PLAN

WEEK 1	**Introduction & Lab Safety** Policies/Procedures/Get to know you Lab Safety, Equipment, etc. **Unit 1: Medical Investigation** **Lesson 1.1: Investigating the Scene** 1.1.1: A Sketchy Scene 1.1.2: Reliable Witnesses? 1.1.3: The Traces We Leave Behind
WEEK 2	**Lesson 1.1: Investigating the Scene** 1.1.4 Blood Evidence 1.1.5 DNA Evidence 1.1.6 DNA Analysis 1.1.7 Status Report
WEEK 3	**Lesson 1.2: Master the Morgue** 1.2.1 Anatomy of an Autopsy 1.2.2 Time of Death 1.2.3 Forensic Toxicology 1.2.4 Histology

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WEEK 4	**Lesson 1.2: Master the Morgue** 1.2.5 Gross Anatomy Examination 1.2.6 Case Closed **Lesson 1.3: Open Investigation** 1.3.1 Crack the Case
WEEK 5	**Unit 2: Clinical Care Days** **Lesson 2.1: Talk to Your Doc** 2.1.1 Building a Medical History 2.1.2 Vital Signs 2.1.3 Routine Testing: In the Office 2.1.4 Routine Testing: In the Lab
WEEK 6	**Lesson 2.1: Talk to Your Doc** 2.1.5 Telehealth 2.1.6 Patient Privacy 2.1.7 Design a Visit
WEEK 7	**Lesson 2.2: Decoding a Diagnosis** 2.2.1 Bothersome Bumps 2.2.2 A Protein Problem 2.2.3 An Inheritance Story

WEEK 8	**Lesson 2.2: Decoding a Diagnosis** 2.2.4 Clues in the Chromosomes 2.2.5 My, Oh, Meiosis 2.2.6 A Family Affair
WEEK 9	**Lesson 2.2: Decoding a Diagnosis** 2.2.6 A Family Affair **Lesson 2.3: New to the Practice** 2.3.1 A New Patient **Unit 3: Outbreaks & Emergencies** **Lesson 3.1: Nosocomial Nightmare** 3.1.1 Outbreak!
WEEK 10	**Lesson 3.1: Nosocomial Nightmare** 3.1.2 Agents of Disease 3.1.3 Modes of Transmission 3.1.4 Evidence Evaluation 3.1.5 Isolation
WEEK 11	**Lesson 3.1: Nosocomial Nightmare**

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	3.1.6 Gram Staining 3.1.7 Transmit the Tale **Lesson 3.2: Emergency Response** 3.2.1 Survey and Assess
WEEK 12	**Lesson 3.2: Emergency Response** 3.2.2 Drug Delivery 3.2.3 Control Bleeding 3.2.4 Crisis Communication
WEEK 13	**Lesson 3.2: Emergency Response** 3.2.5 Medical Surge 3.2.6 Mobile Medical Facility **Lesson 3.3 Information Sharing** 3.3.1 User-centered Design 3.3.2 Public Health Emergency Apps
WEEK 14	**Unit 4: Innovation, Inc.** **Lesson 4.1: Designing the Future** 4.1.1 Open for Innovation 4.1.2 Device Lab 4.1.3 Regenerative Medicine
WEEK 15	**Lesson 4.1: Designing the Future** 4.1.4 Health Promotion 4.1.5 Drug Design Lab 4.1.6 Innovation by Inspiration
WEEK 16	**Lesson 4.2: New Frontiers** 4.2.1 Mapping Innovation 4.2.2 Under the Sea 4.2.3 Out of this World
WEEK 17	**Lesson 4.2: New Frontiers** 4.2.4 New Frontiers **Lesson 4.3: Pioneering the Future** 4.3.1 Pioneering the Future
WEEK 18	EOC & Finals Week

***This is a tentative plan and may change at the discretion of the teacher.**

Embedded Numeracy and Literacy

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Opportunities for numeracy and literacy in the CTE class are critical and help support the goals of CTE in preparing students for college and/or career. Example anchor activities for mathematics include performing various calculations such as serial dilutions and Beer's Law; analyzing data collected from laboratory application and research. Example anchor activities for literacy include: Reading scientific articles, interviewing various medical professionals, investigating various STEM fields and describing their responsibilities and the requirements to enter the field, writing a design brief or other science laboratory report.

Technical Writing

Students will learn to select and use appropriate language and layout for technical documents and write documents that are clear, accurate, and grammatically correct.

CTSO: Students are encouraged to participate in HOSA. Competitive events that relate to a specific topic discussed in class will be highlighted.

I look forward to having a great year! I feel fortunate to have your son/daughter in my class this semester and hope that you will contact me should you have any concerns about the progress of your son/daughter or any aspect of the instruction. With your son/daughter, please read the attached policies, then sign and date this signature page and have your son/daughter submit this on Schoology or print off and return to school. Please provide a current email address and phone number at which I can contact you should the need arise. Please contact me at school via my email with any concerns.

Game On!

Please sign/complete below to acknowledge that you have received, read, and understood the syllabus.

Student Name:	Parent Name:
Student Signature:	Parent Signature: