



Course Syllabus

Principles of Biomedical Science, Spring 2025

Instructor: Jean Marie Peraza

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:

Students will:

Unit 1: Medical Investigation

Lesson 1.1: Investigating the Scene

Lesson 1.2: Master the Morgue

Lesson 1.3: Open Investigation

Use data and evidence to evaluate and justify decisions. Describe the diverse set of careers in the biomedical sciences and the societal impacts of their work. Apply professional standards, as they relate to the personal traits of a biomedical science professional. Communicate effectively with a specific audience. Demonstrate mastery of general laboratory practice common to many biomedical science fields. Design and carry out an experiment that investigates a research question. Collect and analyze experimental data to draw conclusions. Document patient information. Synthesize complex medical information to diagnose a disease, disorder, or injury or to determine cause of death. Explain the connection between structure and function in biology. Devise and execute a plan to solve a problem. Apply an iterative design process to creatively address a need or solve a problem. Create an effective team environment to promote successful goal attainment. Document patient information. Respond to patient and/or community needs and propose treatment strategies for disease, disorder, injury, or the prevention thereof. Explain the role of DNA, RNA, and proteins in the inheritance of traits and the development of diseases or disorders. Select and use appropriate tools, techniques, and/or technologies to analyze genetic information and diagnose disease. Describe how the components of the human immune system fight disease and can be used in prevention and diagnosis. Explain how the composition, structure, and activities of cells build functional systems in the human body. Explain the connection between structure and function in biology. Describe how the systems of the body work together to maintain homeostasis.



Unit 2: Clinical Care

Lesson 2.1: Talk to Your Doc

Lesson 2.2: Decoding a Diagnosis

Lesson 2.3: New to the Practice

Design and carry out an experiment that investigates a research question. Collect and analyze experimental data to draw conclusions. Devise and execute a plan to solve a problem. Use data and evidence to evaluate and justify decisions. Apply an iterative design process to creatively address a need or solve a problem. Describe the diverse set of careers in the biomedical sciences and the societal impacts of their work. Apply professional standards, as they relate to the personal traits of a biomedical science professional. Communicate effectively with a specific audience. Create an effective team environment to promote successful goal attainment. Demonstrate mastery of general laboratory practice common to many biomedical science fields. Document patient information. Synthesize complex medical information to diagnose a disease, disorder, or injury or to determine cause of death. Respond to patient and/or community needs and propose treatment strategies for disease, disorder, injury, or the prevention thereof. Explain the role of DNA, RNA, and proteins in the inheritance of traits and the development of diseases or disorders. Describe cell division and the process by which chromosomes replicate leading to genetic diversity. Analyze genetic information to predict patterns of inheritance. Select and use appropriate tools, techniques, and/or technologies to analyze genetic information and diagnose disease. Explain how the composition, structure, and activities of cells build functional systems in the human body. Explain the connection between structure and function in biology. Describe how the systems of the body work together to maintain homeostasis.

Unit 3: Outbreaks & Emergencies

Lesson 3.1: Nosocomial Nightmare

Lesson 3.2: Emergency Response

Lesson 3.3: Information Sharing

Design and carry out an experiment that investigates a research question. Collect and analyze experimental data to draw conclusions. Devise and execute a plan to solve a problem. Use data and evidence to evaluate and justify decisions. Apply an iterative design process to creatively address a need or solve a problem. Describe the diverse set of careers in the biomedical sciences and the societal impacts of their work. Apply professional standards, as they relate to the personal traits of a biomedical science professional. Communicate effectively with a specific audience. Create an effective team environment to promote successful goal attainment. Demonstrate mastery of general laboratory practice common to many biomedical science fields. Document patient information. Synthesize complex medical information to diagnose a disease, disorder, or injury or to determine cause of death. Respond to patient and/or community needs and propose treatment strategies for disease, disorder, injury, or the prevention thereof. Identify and describe pathogens that cause infectious disease. Describe how the components of the human immune system fight disease and can be used in prevention and diagnosis. Explain how the composition, structure, and activities of cells build functional systems in the human body. Explain the connection between structure and function in biology. Describe how the systems of the body work together to maintain homeostasis.



Unit 4: Innovation, Inc.

Lesson 4.1: Designing the Future

Lesson 4.2: New Frontiers

Lesson 4.3: Pioneering the Future

Design and carry out an experiment that investigates a research question. Collect and analyze experimental data to draw conclusions. Devise and execute a plan to solve a problem. Use data and evidence to evaluate and justify decisions. Apply an iterative design process to creatively address a need or solve a problem. Describe the diverse set of careers in the biomedical sciences and the societal impacts of their work. Apply professional standards, as they relate to the personal traits of a biomedical science professional. Communicate effectively with a specific audience. Create an effective team environment to promote successful goal attainment. Demonstrate mastery of general laboratory practice common to many biomedical science fields. Document patient information. Synthesize complex medical information to diagnose a disease, disorder, or injury or to determine cause of death. Respond to patient and/or community needs and propose treatment strategies for disease, disorder, injury, or the prevention thereof. Describe how the components of the human immune system fight disease and can be used in prevention and diagnosis. Explain the connection between structure and function in biology. Describe how the systems of the body work together to maintain homeostasis.

Classroom Rules and Expectations:

1. **BE ON TIME.** Tardy means that you are not **in the room** and getting seated when the bell rings. If you are not in the room when the tardy bell rings, you will need to go to the attendance office for a tardy slip. JCHS policy governs the consequences for tardiness.
2. **BE RESPECTFUL:** Practice courtesy and mutual respect. Treat others as you would like to be treated. The classroom and laboratory is to be regarded as a safe and supportive learning environment.
3. **BE YOUR OWN PERSON:** Many assignments are to be completed by lab partners or within a group. However, **ALL students are expected to contribute and/or work is to be done individually.** Plagiarizing/copying assignments from lab partners is not acceptable and can result in a zero on the assignment.
4. **BE PREPARED:** Come prepared for class—mentally and with proper materials.
5. **BE WHERE YOUR FEET ARE:** Anything distracting to you, your classmates, or your teacher should be put away during class (phone, food, candy, drinks, etc.) **Cell phones should always be on silent and put away unless you have permission to use them for class assignments. The use of cell phones during tests/quizzes, lecture, and group work can result in a lower grade or “0” on the assignment. Please practice proper cell phone etiquette! If your cell phone becomes a problem, they will go into a “cell phone home” where you can focus on your assignment.**

Please try to take care of any personal business before or after class. I do not want you to miss valuable class time!

James Clemens High School

11306 County Line Road
Madison, AL 35756



Phone: 256-216-5313

Extension: 95214

Email: jcperaza@madisoncity.k12.al.us

Cell Phones: Cell phones and earbuds/headphones will not be allowed to be used during classroom instruction time. Phones and earbuds/headphones will be put away in a location designated by the teacher and placed in silent mode. In secondary schools, students will have access to their phones and earbuds/headphones outside of classroom instruction time such as between classes and lunch. Failure to follow these procedures will result in a disciplinary referral to the office.

Classroom Management Plan

1. Verbal reprimand
2. Conference with student with parent contact
3. Withdrawal of privilege(s) with parent contact
4. Other consequences determined to be reasonable and appropriate by the school administration.

AI Policy: The use of Artificial Intelligence (AI) tools to complete assignments without prior disclosure and approval is strictly prohibited. Any undisclosed use of AI tools will be considered academic dishonesty and will result in an automatic grade of zero for the assignment in question. All assignments are subject to verbal review.

Accommodations: Requests for accommodations for this course or any school event are welcomed from students and parents.

Concerning Laptop Utilization: Student laptops should not be hard-wired to the network or have print capabilities. 2. Use of discs, flash drives, jump drives, or other USB devices will not be allowed on Madison City computers. 3. Neither the teacher, nor the school is responsible for broken, stolen, or lost laptops. 4. Laptops and other electronic devices will be used at the individual discretion of the teacher.

Grading Policy: Test grades will account for 70% of the 9-weeks grade, with the remaining 30% being determined by quiz/daily grades. Some quizzes will count as test grades. The 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. The final exam counts for 20% of the final grade.

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.

James Clemens High School

11306 County Line Road
Madison, AL 35756



Phone: 256-216-5313

Extension: 95214

Email: jcperaza@madisoncity.k12.al.us

Embedded Numeracy and Literacy: 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 femur length to determine height, as well as calculation of blood splatter angle of impact; 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 crime scene investigation report or other science laboratory report.

Make-Up Work Policy: Attendance is crucial for success in Principles of Biomedical Science 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 an alternate assignment to replace the lab grade.**

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

Late work will be accepted with the penalty of 20% deducted per day late for the maximum of 5 school days, but students must discuss turning in late work. **Late work will not be accepted after 1 week after the due date.**

Unexcused Absences: It is very important that you get all absences excused. If you do not, the computer will not allow me to enter a grade above a zero for any given assignment on the day you missed. It is **your** responsibility to take care of this and to let me know when the excuse has been updated. I do not receive notifications that absences have been excused.

Course Materials:

Per Individual:

Lab fee \$30 (paid at schedule pick-up)

Binder and/or Folder

Highlighters

Loose leaf paper

Pens & Pencils

Colored pencils (if you prefer your own)

For the classroom: Roll of paper towels and 1 pack of copy paper

Classroom Wishlist Items (but not required):

Hand Sanitizer

Non-latex gloves

Sanitizing wipes

Tissues

Sanitizing aerosol spray

Command poster strips

Dishwashing liquid

Handsoap

Texts/Required Readings: *No textbook required. The curriculum is provided through Project Lead the Way.*



Course Syllabus
Principles of Biomedical Science Spring 2025
Instructor: Jean Marie Peraza

18 - WEEK PLAN*	
WEEK 1	<p>Introduction & Lab Safety Policies/Procedures/Get to know you Lab Safety, Equipment, etc.</p> <p>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</p>
WEEK 2	<p>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</p>
WEEK 3	<p>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</p>
WEEK 4	<p>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</p>
WEEK 5	<p>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</p>
WEEK 6	<p>Lesson 2.1: Talk to Your Doc 2.1.5 Telehealth 2.1.6 Patient Privacy 2.1.7 Design a Visit</p>
WEEK 7	<p>Lesson 2.2: Decoding a Diagnosis</p>

James Clemens High School

11306 County Line Road
Madison, AL 35756



Phone: 256-216-5313

Extension: 95214

Email: jcperaza@madisoncity.k12.al.us

	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 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

James Clemens High School

11306 County Line Road
Madison, AL 35756



Phone: 256-216-5313

Extension: 95214

Email: jcperaza@madisoncity.k12.al.us

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 syllabus serves as a guide for both the teacher and student; however, during the term it may become necessary to make additions, deletions or substitutions.**

Parent & Student Notifications

Students should check our Schoology classroom as soon as possible. Notes, videos, homework, extra credit, reminders, possible assignments and quizzes/tests will be uploaded often. To join the Schoology classroom as a student, you should have been automatically added, but let me know if you were not. If a parent would like a parent access code, please contact me.

Contact/Science Help:

I will be available to students during Refuel on most days. I encourage both the students and parents to let me know if there is anything I can do to help with student success. Email is the best way to reach me during the year and check my email several times per day. The only bad question is the one that is not asked. Please use me as a resource because I am here to help you! I look forward to helping each of you achieve success this year!