



## **Course Syllabus**

### **Principles of Biomedical Sciences**

**Instructor: Mrs. Laura Phillips**

#### **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 including heart disease, diabetes, sickle-cell disease, hypercholesterolemia, and infectious diseases. They will determine the factors that led to the death of a fictional woman as they sequentially piece together evidence found in her medical history and her autopsy report. The activities and projects introduce students to human physiology, basic biology, medicine, and research processes and allow students to design experiments to solve problems. Key biological concepts including maintenance of homeostasis in the body, metabolism, inheritance of traits, and defense against disease are embedded in the curriculum. 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.

#### **Course Objectives:**

##### **Unit One: Medical Investigation**

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, and the interconnectedness of systems. Students practice synthesizing multiple forms of data to draw conclusions and have opportunities to develop professional communication skills.

##### **Unit Two: 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

##### **Unit Three: Outbreaks and Emergencies**

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.

##### **Unit Four: Innovation, Inc**

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.

# James Clemens High School

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## Classroom Rules and Expectations:

**General:** Students are expected to come to class fully prepared to participate in and contribute to the scheduled activities and to adhere to the following:

1. **Be ready** for class each day.
2. **Be respectful** of yourself, others, the teacher, and the classroom.
3. **Be responsible** for your own attitude, actions, and assignments

**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. Use of discs, flash drives, jump drives, or other USB devices will not be allowed on Madison City computers. Neither the teacher, nor the school is responsible for broken, stolen, or lost laptops. **Laptops and other electronic devices will be used at the discretion of the teacher.**

## Technology Use in the Classroom:

If technology is needed in the classroom, then **school issued Chromebooks must be used**. Personal electronic devices may only be used **at the teachers' discretion**. Personal electronics are to be placed in the designated location when students arrive to class. **Devices will be returned at the end of class (i.e. leave in the location even when they go to the restroom)**. Electronic devices may be out before school, during class change, lunch and after school. Parents, guardians, and other family members should call the front office in case of emergency.

## Grading Policy:

Test grades will account for 70% of the 9-weeks grade, with the remaining 30% being determined by quiz/daily 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.

**Missed Assignments:** If you are present in class but do not turn in an assignment by the due date, I will put a 0 in the gradebook. You are allowed to turn in assignments late; however, 20% of the grade will be deducted for being late. **Excused** absences will be granted 3 days to complete and turn in any missed assignments. After 3 days, the assignment will be counted as late unless extenuating circumstances are discussed with me. Assignments missed due to an **unexcused** absence will be given a 0 in accordance to Madison City Schools policy. Please make sure to turn in an excuse for every absence within 3 days!

## Make-Up Work Policy:

Make-up tests are only allowed for **excused** absences. Students with excused absences should make arrangements with Mrs. Phillips to take any missed assessments. All makeup work can be found on Schoology.

It is highly encouraged to **turn in all work on time** due to the nature of the class. Because this is a project based class, all the material will build on itself, leading up to the summative project at the end of each unit.

## Artificial Intelligence:

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.

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## Mandatory Jet-Lag

Mandatory tutoring will be required for any student whose average drops below a 70. Students will be required to see Mrs. Phillips for 30 minutes during refuel on the day administration designates Science Office Hours. I will have a schedule outside my door for additional refuel days that I am available as well.

## Course Materials:

Each student will need the following individual supplies:

1. 1 or 2 in binder
2. Notebook paper
3. Writing utensil (Pencils are preferred but pens are allowed)
4. Madison City Laptop. Many assignments will require the use of a laptop, as the curriculum is found on the PLTW website.
5. Lab coat to be purchased once class starts. (more info in class). This is the lab coat that students will use as they continue through the biomed pathway.

If you are interested in **donating supplies** to the classroom, we are always in need of dry erase markers, copy paper, and tissues. Any supplies brought in can earn tickets for classroom rewards.

## Texts/Required Readings:

*No textbook required.* The curriculum is provided online and through certain handouts.

## Course Syllabus Principles of Biomedical Science

18 - WEEK PLAN*	
WEEK 1	1.1.1 A Sketchy Scene
WEEK 2	1.1.2 Reliable Witnesses 1.1.3 The Traces We Leave Behind 1.1.4 Blood Evidence
WEEK 3	1.1.5 DNA Evidence 1.1.6 DNA Analysis 1.1.7 Status Report
WEEK 4	1.2.1 Anatomy of an Autopsy 1.2.2 Time of Death
WEEK 5	1.2.3 Forensic Toxicology 1.2.4 Histology

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<b>WEEK 6</b>	1.2.5 Gross Anatomy Examination 1.2.6 Case Closed
<b>WEEK 7</b>	1.3.1 Crack the Case 2.1.1 Building a Medical History
<b>WEEK 8</b>	2.1.2 Vital Signs 2.1.3 Routine Testing: In the Office 2.1.4 Routine Testing: In the Lab
<b>WEEK 9</b>	2.1.5 Telehealth 2.1.6 Patient Privacy 2.1.7 Design a Visit
<b>WEEK 10</b>	2.2.1 Bothersome Bumps 2.2.2 A Protein Problem 2.2.3 An Inheritance Story
<b>WEEK 11</b>	2.2.4 Clues in the Chromosomes 2.2.5 My, Oh, Meiosis 2.2.6 A Family Affair
<b>WEEK 12</b>	2.3.1 A New Patient 3.1.1 Outbreak!
<b>WEEK 13</b>	3.1.2 Agents of Disease 3.1.3 Modes of Transmission
<b>WEEK 14</b>	3.1.4 Evidence Evaluation 3.1.5 Isolation 3.1.6 Gram Staining
<b>WEEK 15</b>	3.1.7 Transmit the Tale 3.2.1 Survey and Assess 3.2.2 Drug Delivery
<b>WEEK 16</b>	3.2.3 Control Bleeding 3.2.4 Crisis Communication 3.2.5 Medical Surge
<b>WEEK 17</b>	3.2.6 Mobile Medical Facility 3.3.1 User-centered Design 3.3.2 Public Health Emergency Apps
<b>WEEK 18</b>	4.1.1 Open for Innovation 4.1.2 Device Lab 4.1.3 Regenerative Medicine

\* 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.