

STEM Innovation Academy of Orange

Medical Interventions

Mr. Jonathan Lerner

Email: lernerjo@orange.k12.nj.us



“Somewhere, something incredible is waiting to be known.”

Course Description

In Medical Interventions (MI), students follow the life of a fictitious family as they investigate how to prevent, diagnose, and treat disease. Students explore how to detect and fight infection; screen and evaluate the code in human DNA; evaluate cancer treatment options; and prevail when the organs of the body begin to fail. Through real-world cases, students are exposed to a range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics. Each new case will introduce multiple types of interventions, ranging from simple diagnostic tests to treatment of complex diseases and disorders. Students practice problem solving with structured activities and progress to open-ended projects and problems that require them to develop planning, documentation, communication, and other professional skills.

Course Unit Summary

Unit 1: How to Fight Infection (25%)

- The Mystery Infection
- Antibiotic Treatment
- The Aftermath - Hearing Loss
- Vaccination

Unit 2: How to Screen What is in Your Genes (15%)

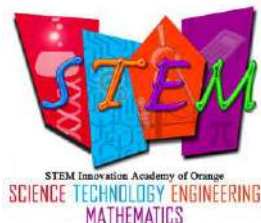
- Genetic Testing and Screening
- Our Genetic Future

Unit 3: How to Conquer Cancer (30%)

- Detecting Cancer
- Reducing Cancer Risk
- Treating Cancer
- Building a Better Cancer Treatment

Unit 4: How to Prevail When Organs Fail (30%)

- Manufacturing Human Proteins
- Organ Failure
- Transplant
- Building a Better Body



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Course Skills Summary

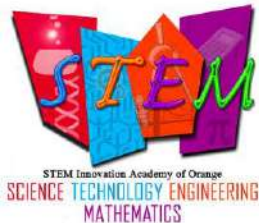
By the end of this course, students will have developed...

- The ability to use standard laboratory techniques, handle laboratory materials safely, collect, manipulate, and present experimental data, and use basic numeracy skills.
- The ability to evaluate their own strengths and weaknesses in the subjects studied to continually demonstrate personal development.
- The ability to use strategies for effective group collaboration, including planning and organization, time management, problem solving, decision making, and creative thinking.
- The ability to demonstrate laboratory skills including aseptic technique, bacterial plating, micropipetting, DNA extraction, restriction enzyme digests, DNA and protein gel electrophoresis, hydrophobic interaction chromatography, and bacterial transformation.
- The ability to demonstrate clinical skills including karyotyping, quantitative ELISA analysis, interpretation of audiograms, blood and tissue typing.
- The ability to demonstrate proficiency in using Microsoft Office, Vernier probes and sensors, Logger Pro, microscopes, and thermal cyclers.
- The ability to demonstrate scientific experimentation skills, including experimental design, constructing and interpreting graphs, data analysis, drawing conclusions based on data, and communicating information effectively.

Instructor

Jonathan Lerner, B.S., M.S.

Mr. Lerner holds a Bachelor's degree in Biology and Secondary Education from The College of New Jersey (TCNJ) and a Master's degree in Biology with a focus in Ecology and Evolution from Montclair State University.



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Classroom Expectations

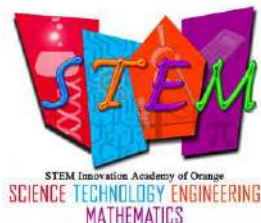
Attendance - MI meets daily for 80 minutes on Monday, Wednesday, and Friday and 70 minutes on Tuesday and Thursday. Each class will be a full work session and classroom attendance is necessary for success in this course. Students are responsible for anything missed when not in class. Most work will be made available on Google Classroom or on PLTW, but please check in with a classmate and contact Mr. Lerner ASAP via email or Remind if you are absent.

Participation - Being an active participant in class is essential to your learning. You are encouraged and expected to share your thoughts and ask questions regarding relevant course material and to be respectful of your peers as they do the same.

Homework - MI students will regularly be assigned homework for MI in order to preview, practice, and review class content. If you are absent the day work is assigned, you are responsible for finding out what was missed, retrieving the work, and establishing a due date with Mr. Lerner. If you are absent on the day an assignment is due, you are still expected to hand in work via Google Classroom or email on the due date in order to receive full credit. Late work may be accepted for partial credit. If you need an extension due to extenuating circumstances, you must contact Mr. Lerner before the due date to establish a timeline for completing the work.

Late homework assignments will incur a 5 pt per school day deduction for five days and a 0 on the 6th school day; yielding a maximum score of 75% for late work. Students may request an extension but they have to exhaust the intervention opportunities first (advisory, office hours, lunch, before school, etc.)

Academic Integrity - Although MI will include a great amount of collaborative group work, each student is responsible for completing their own assignments. Plagiarism, cheating, and any other form of academic dishonesty will not be tolerated - please refer to the STEM Academy Student Handbook for more information.



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Technology

[Google Classroom](#) - Links to worksheets, PowerPoints, and other class materials will be posted here. This is also where you will upload assignments for submission and view teacher feedback.

Remind - The Remind app for the smartphone will allow you and your parents to manage various reminders from many of your teachers. It will also allow you to chat with me via text when you have questions or need help with your MI work.

LoggerPro - A data collection and analysis software which you can download your own version for use at home to complete your data analysis after data collection here at school

[Project Lead the Way](#) - Here you will find the online textbook, downloadable documents, video tutorials, etc. You will need to become familiar with this resource and use it to complete your assignments.

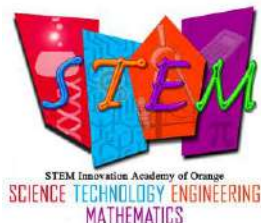
Assessments

- 10% Homework
- 20% Quizzes
- 20% Classwork
- 25% Tests
- 25% Authentic Assessments

Classwork - Classwork assignments may be checked at the end of class or assigned to complete for homework to be submitted the next day. Assignments that do not meet expectations may be returned for correction at Mr. Lerner's discretion. Corrections can be turned in, past the due date in order to earn back partial credit.

Quizzes - Quizzes are designed to be learning experiences that can help you identify gaps in your learning and as an opportunity for daily study. They will be given on a weekly basis and may be unannounced.

Labs - Labs will be graded based on attention to safety and preparation, attention to detail/directions, time usage, cooperation with lab partner, having required supplies and materials, and laboratory notebook documentation. Some labs will include pre-lab assignments, which must be completed before the start of the lab and marked as complete before you can begin the day's activities. Students who do not have pre-lab assignments at



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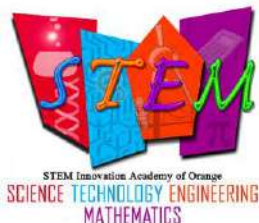
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the start of the period may not take part in the day's activities because the pre-lab assignments will include safety information relevant to the procedures. In this case, you will be dismissed to complete an alternate assignment for partial credit, and will need to schedule a time outside of class with Mr. Lerner to make up the lab when you are prepared.

Tests - Unit tests will be given at the end of each unit we cover. They will be made up of multiple choice questions and short answer questions. Classroom review games will help prepare for these tests. For grades falling below 70%, you will be allowed to make corrections to earn back partial credit up to 70%. Please note, in June, you will take the PLTW End of Course (EoC) computer-based exam. The exam will be graded on a scale of 1-9.

Teacher Availability

Mr. Lerner will be available during advisory periods, after school until 4pm weekdays, and by appointment.



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We, the undersigned student and parent/guardian, have reviewed the expectations of the class/course outlined in the syllabus and accept the terms and expectations as laid out.

I, as the student, further understand that my parent may be contacted if I am found to be in default of my expectations, solely for the purpose of correcting the problem before my grades are put in jeopardy.

(student signature)

(printed name)

(date)

(Parent signature)

(e-mail)

(phone)

Do you have internet access at home?

- ☐ Yes
- ☐ No

Any other information I should know: