Plymouth Public Schools' Science and Technology/Engineering Program Medical Interventions Course Syllabus

STE1052 Medical Interventions Honors

Full year course intended for 11th grade students worth 5 credits

Course Description

In this laboratory course 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. The prerequisites include a minimum grade of C- in Human Body Systems; a passing grade in Chemistry; and departmental recommendation.

Instructional Objectives

Students will independently and collaboratively:

1. Engage in scientific inquiry and engineering design through the use of science and engineering practices.
2. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to answer a question or solve a problem.
3. Draw evidence from literary or informational texts to support analysis, reflection, and research.
4. Produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience.
5. Demonstrate proficiency in phenomena related to the structures and processes of living things from molecules to organisms; the inheritance and variation of traits in heredity; biological evolution; the motion and stability of forces and their interactioncs; waves and their applications in technologies for information transfer; and engineering design.

Themes and Topics

1. Infection: detecting, fighting, and preventing an infectious disease; identifying pathogens by using DNA sequence analysis; using antibody-based Enzyme-linked Immunosorbant Assay; antibiotic therapy and vaccination; development of antibiotic resistant in bacteria; recombinant DNA technology in vaccine development; side effects of disease and treatment of disease
2. Genetics: types of genetic testing, screening, and ethical implications; molecular techniques necessary to complete a genetic test (e.g., isolating DNA, amplifying a part of the gene, restricting section of gene, electrophoresis); medical interventions in fetal development and reproductive technology; gene therapy and ethical implications

3. Cancer: detection and treatment of cancer; physiology of cancer and studying genes involved in cancer; technology of personalized treatment of cancer; reducing the risk of cancer; biomedical technologies used to diagnose and treat cancer; creating prosthetic limbs and new medical interventions with nanotechnology
4. Organs: biomanufacturing of human proteins used in medical interventions with bacterial transformation; diagnosis and treatment of disease based on symptoms; organ donation and organ screening; technology used in replacing failing organs; ethical implications of new technology research

Text and Instructional Materials
My PLTW is used for communications and activities related to this course

Cheating/Plagiarism
The excerpt from the Plymouth Public Schools' Student Handbook on plagiarism and copyright infringement states, "Existing copyright law will govern the use of material accessed through network. The user will not plagiarize works found on the Internet. Plagiarism is taking the ideas or writings of others and presenting them as if they were yours. All copyrighted material used must have the express written permission of the person or organization that owns the copyright. Any student who has cheated on any academic exercise will receive no credit for that exercise. Plagiarism is a form of cheating. A parent/guardian will be notified by the involved teacher in all instances of cheating. The investigation of the claim of cheating and plagiarism will involve the student, teacher, and administration."

Grading Policy and Assessment
Levels of proficiency on various tasks and assignments determine student grades. During each grading term, students' grades will be based upon the following:

30% Homework
70% Assessments

The final year average will be calculated as follows:

22.5% Term 1 Grade
22.5% Term 2 Grade
22.5% Term 3 Grade
22.5% Term 4 Grade
10% Final Exam