

# Medical Interventions (MI)



Course Code CTS-3050  
1 Semester, 1 Credit

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Room B117

## ***The Curriculum***

MI lessons will center around the members of the Smith family, studying their medical issues and determining which interventions to use.

### Unit 1: How to Fight Infection

- find patient zero in a college outbreak.
- classes of antibiotics, how they work, and vaccine development

### Unit 2: How to Screen What is in Your Genes

- debate gene therapy

### Unit 3: How to Conquer Cancer

- describe cancer treatments including chemotherapy and radiation

### Unit 4: How to Prevail When Organs

- genetically engineered microbes
- surgical techniques, including suturing and laparoscopic surgery.

## ***Materials***

- 3-ring binder with loose leaf paper OR notebook and folder
- pens and highlighter
- long pants and close-toed shoes
- headphones  
(Students will be issued a locker)
- Students can access all curriculum from school or home using my.pltw.org
- If absent check our Google Classroom page.

## ***Class Rules***

1. Your Best Effort
2. Kindness
3. Respect

## ***Skills learned in MI include:***

### **Laboratory Skills**

- Aseptic technique
- Bacterial plating
- Micropipetting
- DNA extraction
- Restriction enzyme digest
- DNA gel electrophoresis
- Protein gel electrophoresis
- Hydrophobic Interaction Chromatography (HIC)
- Bacterial transformation

### **Experimentation Skills**

- Design and conduct reliable scientific experiments
- Analyze and interpret laboratory data
- Construct graphs (by hand and using graphing software)
- Interpolate and extrapolate data from a graph
- Draw conclusions based on experimental data
- Thorough and clear verbal and written communication

### **Clinical Skills**

- Karyotyping
- Quantitative Enzyme-linked Immunosorbant Assay (ELISA) analysis
- Interpretation of audiograms
- Blood typing
- Tissue typing
- Technical writing

## ***Grading***

\*SFSD grading scale will be used. PLTW courses are given *weighted grades* in the SFSD.

\*Grades will be calculated using total points ~50% daily labs/projects and ~50% quizzes

\*Extra Credit lectures/experiences will be offered but can raise your grade by a maximum of 1%

\*Students and parents can view grades on SFSD Infinite Campus

\* Academic dishonesty and irresponsible behavior will be dealt with on a case-by-case basis and could include point deductions.

## ***Course Topics***

- **Over-arching themes:**
  - Homeostasis
  - Biomedical science careers
  - Bioethics
  - Design process
  - Interrelationship between body systems and health/disease
  - Current and future medical interventions
- **Infectious disease**
  - Epidemiology
  - Bioinformatics/DNA sequence analysis
  - Antibiotic mode of action and antibiotic resistance
  - Bacterial transduction, transformation, and conjugation
  - Physics of sound and anatomy and physiology of the ear
  - Hearing loss and audiograms
  - Cochlear implant technology
  - Vaccine production and mechanism
- **Innovative medicine**
  - Prenatal screenings
  - Gene therapy
  - Reproductive technology
  - Xenotransplantation and tissue engineering
- **Molecular biology**
  - Recombinant DNA technology and genetic engineering
  - DNA microarrays
  - Restriction Fragment Length Polymorphisms (RFLP) and marker analysis
  - Single Nucleotide Polymorphisms (SNPs) and pharmacogenetics
  - Biomanufacturing of human proteins
- **Cancer genetics, diagnostics, and treatment**
  - Diagnostic imaging
  - Histology ◦ Statistical analysis PLTW | Preparing Students for the Global Economy
  - Biofeedback therapy
  - Prosthetic limb technology
  - Nanomedicine
  - Clinical trials
- **Organ transplant**
  - End Stage Renal Disease
  - Organ allocation policies and organ transplant
  - Laparoscopic surgical techniques
  - Antigen/antibody interactions

