

In the *Biomedical Applications CPU*, students begin with the most fundamental aspects of biomedicine and build toward the more complex ideas and related applications. Students will explore the major branches of biomedical applications and conduct research to develop an understanding of the ethical and practical implications associated with each of the fields studied. The major branches covered in the course are molecular biology, genetics, biomedical research, biofarming and pharmaceuticals, and biomedical engineering.



Areas Covered

- ◆ Overview of biomedical applications
- ◆ Ethical and legal considerations
- ◆ Proper lab procedure and safety
- ◆ Study of diseases at the molecular level
- ◆ DNA
 - Human Genome Project
 - Human development
 - DNA manipulation
- ◆ Biomedicine
 - Recent advances
 - Organ replacement and transplants
 - Transgenics
 - Regenerative medicine
 - Cloning
- ◆ Biomedical engineering
- ◆ Skills and knowledge to aid students in various HOSA competitions



Career Pathway Unit Includes:

Biomedical Applications CD and Instructor's Overview Booklet, Biomedical Applications Video CD, Biomedicine and Biotechnology DVD, Cells CD, Click and Clone CD, DNA Interactive DVD, DNA Model Kit, Genes in a Bottle Kit, Genetics CD, Skills Cart™, Patient Profiles for Cancer Antibody Test, Size Exclusion Chromatography Kit, Strawberry DNA Extraction Kit

Biomedical Applications Goals & Activities

- Research biomedical related career tracks.
- Define biomedical applications.
- Become familiar with the different branches of biomedical applications.
- Explore cell biology and cell division.
- Discover DNA and how it transfers genetic information.
- Construct a model of normal human DNA.
- Research the Human Genome Project.
- Explore genetic mapping.
- Discover the science of genetic inheritance and how DNA can be decoded to predict specific traits.
- Complete a genetic decoding simulation.
- Define molecular diseases such as bacterial and viral infections.
- Define genetic diseases.
- Create a model of abnormal human DNA.
- Compare and contrast bacterial and viral infections.
- Explore aspects of biomedical research.
- Discover scientific method and how research is conducted.
- Explore the history of biomedical research, its failures, and its successes.
- Consider the ethical concerns involved in biomedical research.
- Research the development of vaccinations, prescription drugs, and treatments for illnesses such as cancer.
- Discover how scientists identify antibodies and antigens.
- Explore biomedical applications as they apply to organ transplants.
- Research the ethics related to blood and bone marrow donation.
- Detect antibodies and antigens in fluid samples.
- Explore genetic research.
- Explore stem cell research (both embryonic and adult) and forms of genetic testing.
- Discuss ethics of embryonic stem cell research.
- Create a necklace containing genetic material.
- Define biofarming.
- Conduct an antibiotic sensitivity test.
- Discover how scientists manipulate DNA.
- Define transgenics.
- Discuss the ethics of engineering “transgenic” animals and plants.
- Discover organ replacement options and processes.
- Explore the limitations of organ transplants and other replacement methods.
- Discover gene therapy and its uses in humans.
- Define cloning, its benefits, and limitations.
- Research ethical concerns involving cloning.
- Complete a job shadowing activity.



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