Course Title - Human Biology

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Unit #3 - Pathology

Transfer Goal –

Students will be able to independently use their learning to…

- make decisions and utilize risk avoidance skills that are essential to healthy choices promoting lifelong wellness.
- communicate, identify and appraise ethical problems in medical diagnostic practice and research.

Stage 1 – Desired Results

Established Goals	**21st Century Themes**
New Jersey Student Learning Standards (NJSLS)-Science **http://www.state.nj.us/education/cccs/2016/science/** HS-LS1-2.Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	**(www.21stcenturyskills.org)** _x_ Global Awareness _x__Financial, Economic, Business and Entrepreneurial Literacy _x_Civic Literacy _x__Health Literacy _x_Environmental Literacy

HS-LS1-3. Plan and conduct an investigation to provide evidence that feedback mechanisms maintain homeostasis. HS-LS3-2. Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. HS-LS4-3. Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. HS-LS4-5. Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species HS-ETS1-1. Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.	**21st Century Skills** *Learning and Innovation Skills:* _x__Creativity and Innovation _x__Critical Thinking and Problem Solving _x__Communication and Collaboration *Information, Media and Technology Skills:* _x__Information Literacy _x__Media Literacy _x__ICT (Information, Communications and Technology) Literacy *Life and Career Skills:* _x__Flexibility and Adaptability _x__Initiative and Self-Direction _x__Social and Cross-Cultural Skills _x__Productivity and Accountability _x__Leadership and Responsibility
Enduring Understandings: *Students will understand that . . .* *EU1* the proper functioning of the lymphatic and immune system is the body's defense against infection and disease. *EU2* the major cell and tissue alterations associated with diseases contribute to organ dysfunction or clinical signs and symptoms. *EU3* there are a variety of pathogens that cause disease and are transmittable. *EU4* the prevention and control of diseases and health conditions are affected by many factors.	**Essential Questions:** *EU1* • How do the immune and lymphatic systems use the three lines of defense to deal with pathogens? • How can disruptions in the immune system elicit or exacerbate disease? • How do immune responses work in relation to vaccines? • What role does the lymphatic system play in protecting the human body? • How does the lymphatic system function in coordination with other systems of the body? *EU2* • How does a disease related to cellular dysfunction affect the body? • How might knowing the parts of a cell help us in understanding illnesses of the body? • How are diseases transmitted?

	EU3 • How do pathogens reproduce, spread, mutate and cause disease? • Why are some bacteria harmful, while others are beneficial? • What is the role of antibody-antigen complexes in combating microorganisms? *EU4* • How do antibiotics work and how does antibiotic resistance occur due to the misuse/overuse of antibiotics? • How do vaccines prevent disease? • How could we use the mechanisms of the origin and development of disease and its manifestations in the form of molecular, chemical, physiological and morphological changes? • How can individuals make informed decision about prevention and treatment of communicable diseases?
Knowledge: *Students will know . . .* *EU1* • immune and lymphatic systems use three lines of defense used by the body to deal with pathogens. • disruptions in the immune system elicit or exacerbate disease. • immune responses work in relation to vaccines. • the structure of the lymphatic system and determine how it plays a role in protecting the human body. • the lymphatic system functions in coordination with other systems of the body. • feedback mechanisms maintain a living system's internal conditions within certain limits and mediate behaviors, allowing it to remain alive and functional even as external conditions change within some range. Feedback mechanisms can encourage (through positive feedback) or discourage (negative feedback) what is going on inside the living system. *EU2* • a disease related to cellular dysfunction affects the body. • systems of specialized cells within organisms help them perform the essential functions of life.	**Skills:** *Students will be able to . . .* *EU1* • analyze how the immune and lymphatic systems use the three lines of defense used by the body to deal with pathogens. • examine how disruptions in the immune system can elicit or exacerbate disease. • investigate how immune responses work in relation to vaccines. • model the role the lymphatic system plays in protecting the human body. • represent how the lymphatic system functions in coordination with other systems of the body. *EU2* • analyze how a disease related to cellular dysfunction affects the body. • critically analyze how might knowing the parts of a cell help us in understanding illnesses of the body. • formulate an experiment to demonstrate how diseases are transmitted. *EU3*

• diseases are transmitted. *EU3* • pathogens reproduce, spread, mutate and cause disease. • some bacteria are harmful, in that they cause disease, while others are beneficial (in preventing disease, consumer production, etc) based on the structure and function of the cell to cell interactions. • the role of antibody-antigen complexes are necessary in combating microorganisms. *EU4* • antibiotics fight infections while antibiotic resistance can occur due to the misuse/overuse of antibiotics. • vaccines are made of live or attenuated viruses that trigger an immune response to prevent disease. • the origin and development of disease and its manifestations in the form of molecular, chemical, physiological and morphological changes can be used to understand disease. • individuals can make informed decisions by investigating data, generate alternatives, explore options, select "best" solution, evaluate a plan, communicate decision and take action about prevention and treatment of communicable diseases.	• demonstrate how pathogens reproduce, spread, mutate and cause disease. • draw evidence to show why some bacteria are harmful, while others are beneficial. • model the role of antibody-antigen complexes in combating microorganisms. *EU4* • investigate how antibiotics work and how antibiotic resistance occurs due to the misuse/overuse of antibiotics. • model how vaccines prevent disease. • predict how we could use the mechanisms of the origin and development of disease and its manifestations in the form of molecular, chemical, physiological and morphological changes. • evaluate how individuals can make informed decisions about prevention and treatment of communicable diseases.
Stage 2 – Assessment Evidence	
Other Recommended Evidence: • Laboratory activities • Lab reports and notebooks • Quizzes and tests • Concept maps, graphic organizers, charts, tables, and graphs • Presentations • Class discussion	

Stage 3 – Learning Plan

Suggested Learning Activities to Include Differentiated Instruction and Interdisciplinary Connections: *A= Acquiring basic knowledge and skills, M= Making meaning and/or a T= Transfer.*

- Discuss the immune and Lymphatic systems -A
- hhmi Cells of the Immune System Click and Learn http://media.hhmi.org/biointeractive/click/immunology_primer/01.html?_ga=2.138396467.228014891.1498139177-37658674.1498139177
- Describe antigen-antibody complexes -A
- Operation Antibody -M, T http://www.discoveryeducation.com/teachers/free-lesson-plans/operation-antibody.cfm
- Discuss microbiology - bacteria, fungus, protist, parasites - A
- Describe bacteriology techniques- aseptic, streaking for isolation, gram staining - A
- BioRAD pGLO Bacterial Transformation Kit -M
- hhmi bacterial Identification virtual Lab -M http://media.hhmi.org/biointeractive/vlabs/bacterial_id/index.html?_ga=2.117288709.228014891.1498139177-37658674.1498139177
- Microbiology Webquest - harmful vs helpful microorganisms -A, M
- Investigate Microbiology/Bacteria via a Lab, i.e. BioRAD Microbes and Health Kit: "What Causes Yogurtness?" -M
- Streak plates for Isolation -A, M
- Gram Stain Bacteria for Identification -A, M
- Use Oil Immersion Microscope proficiently -A, M
- Discuss pathogenic diseases - A
- Discuss overuse of antibiotics and antibiotic resistance -A
- Calculate and describe zones of inhibition - Antibiotic Resistance Activity -A, M
- Discuss virus and vaccines -A
- hhmi Virus Explorer Click and Learn -M,T http://media.hhmi.org/biointeractive/click/virus-explorer/?_ga=2.176006305.228014891.1498139177-37658674.1498139177
- Create a 'wanted poster' of a virus -A
- Create a Public Service Announcement about the importance of prevention or treatment of a communicable disease - M, T
- Discuss the lymphatic system - A
- Construct a model of a lymph node that shows how and why it works effectively; also explains why lymph nodes are removed from areas close to malignant tumors -A, M, T
- hhmi Stopping Mosquito-Borne Disease Click and Learn -M, T http://media.hhmi.org/biointeractive/click/Dengue/01.html?_ga=2.107995905.228014891.1498139177-37658674.1498139177
- hhmi From Birds to People: The West Nile Virus Story Click and Learn -M, T http://media.hhmi.org/biointeractive/click/West_Nile_Virus/01.html?_ga=2.143585078.228014891.1498139177-37658674.1498139177
- Investigate Regenerative Medicine / Alternative Medicine -T

- hhmi Immunology virtual lab -M, T
  http://media.hhmi.org/biointeractive/vlabs/immunology/index.html?_ga=2.146572087.228014891.1498139177-37658674.1498139177
- BioRAD ELISA Immuno Explorer Kit: Real Antibodies, Real Learning, Real Fun
- hhmi Drug Adherence and Resistance Click and Learn -M, T
  http://media.hhmi.org/biointeractive/click/adherence/01.html?_ga=2.104310787.228014891.1498139177-37658674.1498139177
- BIO-RAD Protein Expression and Purification Series: From Industrial Enzymes to Cancer Therapy -M, T
- hhmi Classroom Activities: Stem Cells and Diabetes -M, T
  http://www.hhmi.org/biointeractive/classroom-activities-stem-cells-and-diabetes