Harvard Summer Program Immunology Project Resource Information	
Title	Immunology Primer (Mary Anne Lynn)
Resource Type	__Lesson Plan __Activity ___ Lab Activity _X__Web-quest
Description	The Immune System Primer offers a self-directed study of the Human Immune System. biology students basic knowledge of the various mechanisms the body employs to defen contains links to a number of on-line animations and reference materials.
Author(s)	Mary Anne Lynn
Author Institution(s)	Reading Memorial High School
Objective	The student will be able to: • Identify the role each item plays in fighting an infection: skin, mucus, saliva, swe cells, fever, B cells and T cells • Identify four symptoms of inflammation • Describe the importance of washing one's hands • Explain how Hepatitis A virus is spread • Define the following terms: adaptive immunity, antigen, antibody, histamine, imı lymphocyte, pathogen • Compare and contrast T and B cells • Use leucocytes to describe the process of cell differentiation • Describe the immune response • Identify four major types of infectious agents • Using leucocytes, provide examples of how cell structure is related to function • Compare and contrast plasma and memory cells • Distinguish between a primary immune response and a secondary immune respor
Key Concepts	• Hepatitis A is contagious and can be transmitted when food handlers fail to wash • Individuals can be vaccinated against Hepatitis A. • Viruses, bacteria, fungi, protozoa and parasitic worms can be disease-causing age • The Immune System protects the body against pathogens. • Physical Barriers,and their secretions act as the body's first line of defense again • Innate immunity is activated early in infection. Phagocytic and Natural Killer Ce provide the body with non-specific immunity. • Antigens are foreign substances that elicit an immune response. • Macrophages and B cells are antigen-presenting cells • T helper cells are activated by antigen presenting cells • Lymphocytes provide adaptive immunity against a specific antigen. • Antibodies prevent antigens from attaching to the surface of host cells and/or targ • A secondary immune response is faster and more effective than a primary immun
Student Prep	This activity incorporates aspects of cell structure, function and differentiation and is the has been taught.
Materials	Access to computer with the following programs: shockwave,
Grade level(s)	Grades 9-12
Teacher Prep Time	Minimal, • Go through the lessons to ensure that they are clear

	• If activity will be completed at school, be sure that computers are loaded with nec
Class Time	Lesson#1:Invitation to Learn: 15 minutes (5 min to review) Lesson #2: Non-Specific Immunity: 30 minutes (15 min to review) Lesson #3: Specific Immunity: 30 minutes (20 min to review) Lesson #4: Primary and Secondary Immune Response: 20 minutes (10 min to review) Note: Times are estimated as activities have not been done by students, yet.
National Standards	**National Standards, Level IV Grade: 9-12** **Standard 5** **Understands the structure and function of cells and organisms** **Level IV Grade : 9-12** 1. Knows the structures of different types of cell parts (e.g., cell wall; cell membrane; cy the nucleus, chloroplast, mitochondrion, Golgi apparatus, vacuole) and the functions they materials, storage of genetic information, photosynthesis and respiration, synthesis of ne 2. Understands the chemical reactions involved in cell functions (e.g., food molecules tal provide the chemical constituents needed to synthesize other molecules; enzymes facilita molecules) 4. Knows how cell functions are regulated through changes in the activity of the function through the selective expression of individual genes, and how this regulation allows cells and to control and coordinate cell growth and division 6. Understands the processes of cell division and differentiation (e.g., meiosis, mitosis, e replication and differentiation into the many specialized cells, tissues, and organs that co cell retains the basic information needed to reproduce itself)
State Standards	**Massachusetts Curriculum Frameworks** 2. Structure and Function of Cells • 2.1 Relate cell parts/organelles to their function • 2.5 Explain the role of cell membrane as a highly effective barrier 4. Human Anatomy and Physiology • 4.1 Explain how major organ systems in humans have functional units with speci function of that organ system
Sources	"Boogers and Snot." Thinkquest. Oracle Education Foundation. http://library.thinkquest.org/J0112390/Boogers.htm?tqskip1=1 "Breaking a Sweat Produces Germ Fighter." Preventdisease.com http://preventdisease.com/news/articles/breaking_sweat_produces_germ_fighter.shtml "Cellular Immune System: Origins" http://academic.brooklyn.cuny.edu/biology/bio4fv/ immune.html "Define: Antigen." google.com

	"Infection Dissection.: The Why Files. http://whyfiles.org/121emerg_infect/2.html "Inflammatory Response." Univ. of Missouri Health Care. http://science.nhmccd.edu/biol/ap2int.htm#lymph. MA Department of Public Health. "Public Health Fact Sheet: Hepatitis A." http://cbs4boston.com/siteSearch/local_story_168183458.html MA Science and Technology/Engineering Curriculum Framework Curriculum Framewo www.doe.mass.edu/frameworks/scitech/2001/standards/ls9_101.html National Science Standards, 4th edition. Mid-continent Research for Education and Lear http://198.17.205.11/about/sitemap/sitemap.asp "Phagocytosis". Cells Alive. http://www.cellsalive.com//mac.htm "Primary and Secondary Immune Response." http://academic.brooklyn.cuny.edu/biology/bio4fv/page/aviruses/helperTcells.html Schittek, B., ... and C. Garbe. 2001. Dermcidin: A novel human antibiotic peptide secrete Immunology 2(December). "Saliva. " Thinkquest. Oracle Education Foundation. http://library.thinkquest.org/2935/Natures_Best/Nat_Best_High_Level/Immune_Net_Pa "Surviving AIDS: Fighting Back." NOVA Online. http://www.pbs.org/wgbh/nova/aids/immunewave.html "The Cytotoxic T Lymphocyte" Cells Alive. http://www.cellsalive.com/ctl.htm. "The Humoral Immune Response Tutorial." Life: The Science of Biology, Sixth Edition. Company. http://www.whfreeman.com/thelifewire6e/content/ch19/ch19xe04.htm "The Immune System." NIAID Net News. http://www.niaid.nih.gov/final/immun/immur "Understanding the Immune System" National Cancer Institute http://press2.nci.nih.gov/sciencebehind/immune/immune02.htm
References	Campbell, Neil A., and Jane B. Reece. "The Body's Defenses." Biology. San Francisco, 900-916.
Assessment	Completion of webquest