Pathogens Unit Vocabulary, Diseases, Immune System Response and Germ Theory Scientists

Pathogen – organisms that produces a disease as they use a host as a food source (aka parasites): viruses, bacteria, fungi, protozoa and worms

Pathology – the study of the origin and nature of diseases

Vector – animals that carry a pathogen and transmit the pathogen to another species, such as to humans.

Host organism – an organism that provides nutrients and shelter to a parasite or pathogen

Virus – an infectious agent made of a core of DNA or RNA surrounded by a protein coat; requires a host cell to reproduce

Pathogenic Bacteria – single-celled prokaryotic organism that cause disease

Pathogenic fungi – single or multicellular eukaryotic organisms that absorb nutrients from the host organism

Pathogenic protozoa – eukaryotic single-celled organisms that obtain nutrients from a host (ex's. are amoeba, flagellates and ciliates)

Pathogenic worm – parasitic animals that most commonly enter the body through the mouth or nose in the egg stage and then hatch, grow and may reproduce within the host

Vaccine – a weakened or killed form of a pathogen is injected to trigger a protective immune response – the formation of antibodies and memory cells which are always ready to fight the real pathogen in the future

Vaccination or inoculation – the process of receiving vaccines to prevent disease.

Immune system – your body's defense system of specialized cells and chemicals that attack and kill foreign invaders

Immune – having the immune system defenses against an infection by a particular pathogen caused disease

Antigen – a substance (such as a pathogen) that is recognized by the immune system as foreign to the body and therefore triggers an immune system response

Antibody – specialized proteins made by certain white blood cells of the immune system that find and stick to antigens so that T cells and macrophages can then come and destroy the antigen (there is a unique antibody for each unique antigen)

Infection – a state of disease in which a pathogenic organism invades and then multiplies within a host

Germ theory – theory that many diseases are caused by microorganisms; theory was gradually developed in Europe and the U.S. in the 1800's

Diseases to know:

<u>viral</u> – chicken pox, small pox, influenza, measles, mumps, polio, rabies, Ebola

<u>Bacterial</u> – Lyme disease, strep throat, bacterial pneumonia, staph infections

<u>Protozoan</u> – toxoplasmosis, malaria

<u>Fungal</u> – athlete's foot and ring worm; both are fungal skin infections in which the fungi absorb nutrients from skin cells

<u>Worm</u> – cysticercosis, caused by a tapeworm

Vector examples to know:

Tick-borne – Lyme disease, Rocky Mountain Spotted Fever

Mosquito-borne – yellow fever, West Nile Virus, malaria

People to know:

Antony van Leeuwenhoek – known as the father of microbiology as he was the first to see and describe bacteria and other microscopic organisms through the microscopes that he developed in the 1670's

Edward Jenner – coined the term vaccine in 1798 from his careful experimentation with inoculating people against getting the smallpox disease (note that nothing was known of viruses at this time)

Ignaz Semmelweis – contributed to the future germ theory in the 1840's by realizing that doctors were transmitting infections to their patients and instituted hand washing and disinfecting of medical instruments in his maternity clinics (his ideas were not widely accepted)

John Snow – proved his theory that cholera was not caused by "bad air", but that it was carried in water contaminated with human feces

Louis Pasteur – late 1800's developed the germ theory of disease and discovered which bacteria causing various infectious diseases

Joseph Lister – popularized the practice of sterilizing medical instruments for surgery in the late 1800's; he was inspired by the germ theory of Pasteur

Dmitry Ivanovsky – coined the term virus in 1892 in an experiment that showed that sap from a tobacco plant still remained infectious to healthy plants without the presence of bacteria

Alexander Fleming – in 1928 discovers a fungi (mold) that kills bacteria and creates the first antibiotic medication, penicillin

Be able to… write a 3-5 sentence description of the contribution of one of these scientists to understanding and preventing pathogenic diseases.

Generalized and Very Basic Breakdown of an Immune Response to the Invasion of an Antigen

Patrolling white blood cells detect an antigen → these cells produce antibodies → the antibodies attach themselves to the antigens which marks them for destruction → macrophages and T cells seek out the marked antigens and destroy them; the T cells will also kill any of your infected body cells too → some white blood cells become memory cells which are cells that stay in the body to be ready to immediately destroy that same antigen when it tries to invade again