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| Clarifying objective: 8.L.1.1  Summarize the basic characteristics of viruses, bacteria, fungi and parasites relating to the spread, treatment and prevention of disease. | | |
| What came first:  **5.L.1.1** Explain why some organisms are capable of surviving as a single cell while others require many cells that are specialized to survive. | | |
| What comes next:  **Bio.1.2.3** Explain how specific cell adaptations help cells survive in particular environments (focus on unicellular organisms). | | |
| 5E Lesson Cycle | Lesson ideas | |
| Engage | Have students complete the [sort card](http://cmapp.wcpss.net/uploads/files/ms_science/g8_science/8.l.1.1_engage.docx) activity.  Choose a video from [Discovery's "Monster's Inside of Me"](http://animal.discovery.com/videos/monsters-inside-me/) to show to the class and expose them to examples of diseases/disorders caused by microbes. This short clip will provide quick, high interest coverage of everything that the students will be studying in this unit. Introduce this unit as an exploration of all of these concepts that will end with students creating projects of diseases that have made historical impact on humans.  <http://animal.discovery.com/videos/monsters-inside-me-pork-tapeworm-in-brain.html>  **Option 1**: Use this option if students show little understanding of the vocabulary words for the unit: If you used the concept sort cards, have students pull the following cards: parasite, disease, host, treatment, spread, and prevention. Watch the video again, this time the students should hold up the card for you to see as the concept on the card is discussed in the video. Example: life cycle of the tapeworm=spread of the disease. After viewing, discuss each concept card and how it was illustrated in the video.  **Option 2**: After viewing, have a class discussion about major themes that were discussed. For example, if students view "Pork Tapeworm in the Brain", students should identify the lifecycle of the parasite, how a human is exposed, the effects of the parasite on the body, treatment methods, etc. Make a list of these and have all students copy them in their notes. | |
| Explore | Have students complete the [Infectious Diseases](http://app.discoveryeducation.com/player/view/assetGuid/6e052dbd-2094-4f5e-873e-ed33bd7a6cab) activity in Discovery Ed. | |
| Explain | Guide students [in researching common diseases and microbes](http://cmapp.wcpss.net/uploads/files/ms_science/g8_science/8.l.1.1_explain.docx). | |
| Elaborate | [Who Am I?](http://cmapp.wcpss.net/uploads/files/ms_science/g8_science/g8sci_64_who_am_i_elaborate.docx) activity  Have students create different roles to act out: a doctor who makes a diagnosis based on symptoms, a patient who is infected with a microbe, and a microbe that causes a disease. Students should create these roles based on their research in the Explain stage. This activity begins when the microbes "infect" the patient. The microbe will list their characteristics to the patient, and the patient must guess if it is a virus, bacteria, fungus, or parasite. The microbe and patient must then travel to the "doctor" who will ask questions to try and figure out what the source of the disease is and make recommendations based on symptoms.  *Consider the following assignments:*  ***Microbe****: middle level student who can identify basic structures and characteristics and would benefit a struggling student to partner with as they travel.*  ***Patient:****a**struggling student who would benefit from a peer tutor and reinforcement of the concepts by creating and answering questions.*  ***Doctor:****high level student who would benefit from creating higher order questions.* | |
| Evaluate | Have students complete the brief [constructed response](http://app.discoveryeducation.com/player/view/assetGuid/113AB323-207C-46A0-A9A8-BD5D987D0D63) question from Discovery Ed. | |
| Additional Resources | | |
| 5E lesson from Learn NC on a [rabies outbreak in NC](http://www.learnnc.org/lp/editions/criticalthinking/6654) | | |
| CK12 textbook: [Diseases and the Body’s Defenses](http://www.ck12.org/book/CK-12-Life-Science-For-Middle-School/r7/section/21.0/MS-Diseases-and-the-Body%25E2%2580%2599s-Defenses-%253A%253Arev%253A%253A-1-%253A%253Aof%253A%253A-Life-Science-For-Middle-School/)  [Protists and Fungi](http://www.ck12.org/book/CK-12-Life-Science-For-Middle-School/r7/section/9.0/) | | Discovery Ed lesson: [Immune System](http://science.discoveryeducation.com/concept.cfm?CID=0416a1f3-b432-4abf-9f31-e753a9bdf6d6) (some parts) |
| **Teacher Notes:**   * **microbiology as a basic science explores microscopic organisms including viruses, bacteria, protozoa, parasites, and some fungi and algae**   These organisms lack tissue differentiation, are unicellular, and exhibit diversity of form and size.   * **viruses, bacteria, fungi and parasites may infect the human body and interfere with normal body functions**   Some kinds of bacteria or fungi may infect the body to form colonies in preferred organs or tissues.  o ***Viruses***  -Viruses are non-living particles composed of a nucleic acid (DNA or RNA) and a protein coat.  -Viruses need a host cell to reproduce.  -Viruses invade healthy cells and use the enzymes and organelles of the host cell to make more viruses, usually killing those cells in the process.  -Viral diseases are among the most widespread illnesses in humans. These illnesses range from mild fevers to some forms of cancer and include several other severe and fatal diseases. Transmission of these illnesses varies; some are transmitted by human contact, while others are transmitted through water or an insect bite.  -Vaccines and some anti-viral drugs are used to control and prevent the spread of viral diseases.  o ***Bacteria***  -Bacteria are prokaryotic single-celled organisms.  -Bacteria can live in a variety of places (with oxygen, without oxygen, extreme hot, extreme cold).  -Bacteria reproduce through binary fission, a form of asexual reproduction. Under optimal conditions, bacteria can grow and divide extremely rapidly, and bacterial populations can double very quickly.  Antibiotics are used to inhibit the growth of bacteria. Because antibiotics have been overused, many diseases that were once easy to treat are becoming more difficult to treat. Antibiotic resistance in bacteria occurs when mutant bacteria survive an antibiotic treatment and give rise to a resistant population.  o ***Fungi***  -Fungi are eukaryotic, non-photosynthetic organisms, and most are multicellular heterotrophs.  -Most fungi reproduce both sexually and asexually (producing spores). This provides an adaptive advantage. When the environment is favorable, rapid asexual reproduction ensures an increased spread of the species. During environmental stress, sexual reproduction ensures genetic recombination, increasing the likelihood that offspring will be better adapted to the new environmental conditions.  -Fungi can sometimes attack the tissues of living plants and animals and cause disease. Fungal disease is a major concern for humans because fungi attack not only us but also our food sources, making fungi competitors with humans for nutrients.  -Mold spores can cause mild to serious allergies in some people. Billions of mold spores can become airborne and may then be inhaled, triggering an allergic reaction.  o ***Parasites***  -A parasite is an organism that feed on another individual, known as the host. They either live on or in their host’s body.  -Natural selection favors adaptations that allow a parasite to efficiently exploit its host. Parasites are usually specialized anatomically and physiologically. Tapeworms are so specialized for a parasitic lifestyle that they do not even have a digestive system. They live in the small intestine of their host and absorb nutrients directly through their skin.  -Infectious disease may also be caused by animal parasites, which may take up residence in the intestines, bloodstream, or tissues.  *Teacher Note: It is not necessary for students to know specific diseases or disorders caused by microorganisms.* | | |