

Antibiotic Resistance Unit

Lesson 1. Exploration of MRSA and other Antibiotic Resistant Cases

45-90 min (Depending on length of Frontline Video.)

Goals for the lesson

1. Students develop a basic awareness of the problem of antibiotic resistance.
2. Students develop an interest in exploring the underlying science of antibiotic resistance.
3. Provide a context for students to learn and apply how natural selection occurs in populations.
4. Provide a context for students to review and apply the following scientific concepts:
 - a. Bacterial cell structure
 - b. Protein synthesis
 - c. Effects of gene mutations on proteins.

Instructional Sequence	Materials
Instructor presents guiding questions for the unit: <ol style="list-style-type: none">1. How and why do antibiotics become useless?2. How can what we know about antibiotics be applied to other biological issues?	Guiding Questions and Skills Objectives Handouts
Class watches the first 9 Minutes of the Frontline video "Hunting the Nightmare Bacteria." The segment introduces the issue with MRSA and antibiotic resistant bacteria through the story of a little girl who dies from a pan-resistant infection. http://www.pbs.org/wgbh/pages/frontline/hunting-the-nightmare-bacteria/ An alternative (newer) video to generate interest could be the Frontline video "The Problem with Antibiotics." This segment investigates the growing issue of antibiotic resistance through two stories: the use of antibiotics in agriculture and the case of a resistant infection in the NIH. http://www.pbs.org/wgbh/pages/frontline/trouble-with-antibiotics/	Computer Projector with speakers
Introduce need to inquire into the purpose and reliability of the source. Quickly discuss the purpose and reliability of the Frontline segment.	Knowing Your Sources Handout
Students work in small groups with each person accessing a different text. The texts provide different information for a series of questions about bacteria, antibiotics, and MRSA. Students answer questions using their assigned source. Additionally, students complete a brief evaluation of each resource using their "Knowing Your Sources" handout. <ol style="list-style-type: none">1. Case text (CT)-Personal account of dealing with MRSA, <i>Personal Blog</i>: http://tutusandtantrums.blogspot.com/2012/02/my-experience-with-mrsa.html2. CT-Personal account of dealing with MRSA, <i>Daily Strength Support Group</i>: http://www.dailystrength.org/c/Methicillin_Resistant_Staphylococcus_Aureus/forum/7578667-my-experience-ca-mrsa3. CT-Popular media account with an embedded case, <i>USA Today</i> article: http://www.usatoday.com/story/news/nation/2013/12/16/mrsa-infection-community-schools-victims-doctors/3991833/	MRSA Case Exploration Handout

<ol style="list-style-type: none"> 4. CT-Medical website pictures and descriptions, <i>MedicineNet</i> slideshow: http://www.medicinenet.com/mrsa_picture_slideshow/article.htm 5. Optional texts for use after individuals complete their text or if there are more than 4 students in a group <ol style="list-style-type: none"> a. CDC MRSA fact sheet: http://www.cdc.gov/mrsa/community/ b. MRSA website-multiple personal stories: http://www.mrsaresources.com/mrsa-education/personal-mrsa-stories/ <p>Once students investigate their individual sources, they share their results, filling in questions they weren't able to answer from just one source.</p>	
<p>Conclude this initial investigation and exploration with a whole-class discussion. This discussion may help address additional questions students may have. Some questions to begin the discussion include:</p> <ol style="list-style-type: none"> 1. Why is the issue of antibiotic resistance important to us? 2. Does anyone have personal stories about antibiotic resistant infections or MRSA? 3. How reliable were your sources? How did you make these conclusions? 4. What additional questions do you have about antibiotic resistance? (Class might want to write these questions down for reference as unit develops.) 	

Formative Assessment

Instructor will gain an understanding of what students do / don't know about MRSA, antibiotic resistance, and natural selection through the whole class discussion.

NOTE: At this point, do not use the words natural selection or evolution. The goal is for students to build a conceptual understanding without using terminology that could create bias.