Battling Bugs through PBL

Steven Fowler
North Springs High School, Fulton County Schools
Elizabeth Friedle and Wendy Fasulo
Emory University Graduate Program in Biological and Biomedical Sciences

This material is based upon work supported by the GK-12 program of the National Science Foundation, under Award #DGE0231900. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation. For more information, see the PRISM website at http://www.prism.emory.edu

Block Schedule: 90-minutes/class

Fall
Honors Microbiology (3 sections, 9 weeks)
Honors Biotechnology (3 sections, 9 weeks)

Spring
Honors Biology (2 sections, 18 weeks)
Global Studies (1 section, 18 weeks)
Honors Microbiology

**TOPICS ON SYLLABUS**
- Scope and History
- Microscopy and Staining
- Cell Structure and Function
- Bacterial Growth
- Viruses
- Sterilization
- Antimicrobial Therapy
- Immunology
- Microbial Diseases
- Environmental Microbiology
- Applied Microbiology

**CASES**
1. Between the Living and the Dead (Intro Case, 8/17 – 8/19)
2. Kissing Amy (9/13 – 9/17)
3. To vaccinate or not to vaccinate: that is the question (2 days)
4. Kevin and the Carn-evil Food (3 days)

Honors Biotechnology

**TOPICS ON SYLLABUS**
- Introduction
- Gene Expression (DNA → protein)
- Recombinant DNA Technology
- Ethics
- Forensics

**CASES**
1. How Now Mad Cow (2 days, to be prepared by student assistant Karin Singler)
2. Dr. Collins and the Case of the Mysterious Infection (Restriction Enzyme Analysis, 5 days)
3. To vaccinate or not to vaccinate: that is the question (re-worked as ethics case, 2 days)
Kissing Amy
Scene 1

Kissing Amy – Implementation Plan
Facilitation by Steven and Elizabeth (Karin?, Wendy?)
To be implemented September 13-17, 2004

<table>
<thead>
<tr>
<th>Scene</th>
<th>Objectives</th>
<th>Assessment/Labs</th>
<th>GA P.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Students will define bacterial meningitis, identify symptoms and at least 2 bacterial pathogens that cause meningitis. Also, describe the pathology of meningitis, how infection occurs and is transmitted.</td>
<td>One page written notice regarding the outbreak to be distributed to the community, parents, and posted in the school.</td>
<td>SCSh1.a,b,c, SCSh2.a,c,d,e,f, SCSh6.c,d, SCSh8.a,b, SB3.a, SB4.a</td>
</tr>
</tbody>
</table>
| 2     | Students will propose a simple quick test for Gram classifications. | GRAM STAINING LAB
One page write-up of results of Gram stain describing the envelope of their unknown bacteria (with drawings). | SCSh1.a,b,c, SCSh3.a-f, SCSh4.a, SCSh6.c,d, SCSh8.a,b, SB3.a |
| 3     | Determine an appropriate test for determining the efficacy of several antibiotics against the bacteria. Also, students will describe the mode of action of an antibiotic. | ZONE OF INHIBITION ASSAY LAB
Chart of results of zone of inhibition lab. Also, the students must make their choice of an antibiotic with a written rationale. | SCSh1.a,b,c, SCSh3.a-f, SCSh4.a, SCSh6.c,d, SCSh8.a,b, SB3.a, SB4.a |
| 4     | Students will describe the premature termination of antimicrobial therapy and graph levels of bacteria over time course of treatment. | Student-written epilogue describing what happens to Bob and why. | SCSh1.a,b,c, SCSh3.a-f, SCSh4.a, SCSh6.c,d, SCSh8.a,b, SB3.a |