

TEACHER ACTIVITY RESOURCE SHEET

HIGH SCHOOL BIOLOGY/HEALTH CURRICULUM

VIRUSES, BACTERIA AND ANTIBIOTIC RESISTANCE

Fast Activities (to do during the lesson)

- » Balloon Popping Exercise: To demonstrate germ transmission with an uncovered sneeze.
Instructions:
Put a small amount of water into a balloon (a few drops is all you need). Blow up the balloon and tie it off. Gather some of the students into a circle; hold the balloon above their heads, count to three and pop the balloon. Water droplets will disperse through the air, just like an uncovered sneeze.
- » Glo Germ Activity: To demonstrate proper hand washing technique. Use Glo Germ lotion and a black light to demonstrate how germs spread from person to person.
Instructions:
Place a little bit of Glo Germ lotion (<http://www.glogerm.com>) on the first student's hands in each row. Have the student rub it in and shake hands with the person next to him, repeating the handshaking to the end of the row. Turn off the lights in the room. Turn on the black light and hold it over the student's hands to illuminate the white lotion. Just like germs, hands touching spread the lotion.

Videos

- » Flu Attack! How A Virus Invades Your Body
This 3½ minute animated video from NPR shows how viruses in your body can multiply and make you sick. <http://www.npr.org/blogs/krulwich/2011/06/01/114075029/flu-attack-how-a-virus-invades-your-body>
- » Streptomycin: A Pioneer Antibiotic
This 10-minute video (from The Waksman Foundation) talks about Streptomycin and the development/testing of antibiotics. www.waksmanfoundation.org/video/video_640.html
- » Emerging and Re-emerging Infectious Diseases
The National Institute of Health offers this high-school curriculum supplement. Student activities include lab experiments with bacteria, accompanied by online video support for experiments. (The first link below takes you to the web version. The second link takes you to info on other available formats.)

http://science-education.nih.gov/supplements/nih1/diseases/guide/guide_toc.htm

<http://science-education.nih.gov/Customers.nsf/highschool.htm>

Lab Exercises

- » How Many Microbes? (Dilution Plating Technique)
Marine Biological Laboratory - Uses samples of soil, compost, and others to try to get an idea of how numerous and diverse bacteria are in these environments.
<http://www.waksmanfoundation.org/labs/mbl/microbes.html>
- » Skin Cleanliness
Louisiana State University - Demonstrates "transient" versus "normal" flora of the skin, host defenses and the effects of washing/disinfecting.
<http://www.waksmanfoundation.org/labs/lsu/skin.html>
- » Determining the Effectiveness of Hand washing
Summer Research Program for Science Teachers - Students grow bacterial colonies and determine 1) the effectiveness of hand washing 2) the effectiveness of antibiotics in killing the bacteria.
<http://www.scienceteacherprogram.org/biology/Rokach99.html>
- » "Bugs" That Produce Drugs To Kill "Bugs"
Science in The Real World: Microbes in Action Program - Demonstrates how certain microorganisms produce antibiotics that inhibit the growth of other microorganisms.
<http://www.umsl.edu/~microbes/pdf/Bugs%20That%20Kill%20Bugs.pdf>
- » Antibiotic Resistance in E. Coli
Summer Research Program for Science Teachers - Tests the concept of antibiotic resistance using two strains of E. Coli.
<http://www.scienceteacherprogram.org/biology/Webster02.html>
- » Is Bleach a Good Disinfectant?
Science in The Real World: Microbes in Action Program - Determines the concentration of household bleach that effectively kills E. coli.
<http://www.umsl.edu/~microbes/pdf/bleach.pdf>
- » Which Household Cleaners or Soaps Work Best Against Bacteria?
Summer Research Program for Science Teachers - Tests the effectiveness of various household cleaning products or soaps for their antibacterial ability.
<http://www.scienceteacherprogram.org/biology/Pittis00.html>

Additional Lesson Plans

- » Why Does Evolution Matter Now?
Public Broadcasting Service - In this lesson plan for high school, students investigate the growing problem of antibiotic resistance.
<http://www.pbs.org/wgbh/evolution/educators/lessons/lesson6/act1.html>
- » Microbes: Too Smart for Antibiotics?
This lesson focuses on examining why microbes become resistant to antibiotics, as well as their roles in human health and the environment.
http://www.actionbioscience.org/evolution/lessons/meade_callahanlessons.pdf

Useful Links for Student Research

- » Microbe Zoo - An interactive web site, where students can click on an environment to find the microbes that live there.
<http://commtechlab.msu.edu/sites/dlc-me/zoo>
- » National Institutes of Health
<http://www.niaid.nih.gov/topics/antimicrobialresistance>
- » Centers for Disease Control and Prevention
<http://www.cdc.gov/drugresistance/index.html>
- » Food and Drug Administration
<http://www.niaid.nih.gov/topics/antimicrobialResistance>
- » World Health Organization
<http://www.who.int/drugresistance/en>
- » Alliance for the Prudent Use of Antibiotics
<http://www.tufts.edu/med/apua>

Glossaries

- » Bioremediation and Phytoremediation Glossary
<http://bioremediation.tripod.com>
- » Glossary of Environment & Microbiology Terms (high school level)
<http://www.alken-murray.com/glossarybug.html>