

## Apogee Program Session 2

Biology Breakout: Epidemiology and Immunology

### Course Description:

Germs will be a term of the past! This laboratory-focused course introduces students to the fields of epidemiology and immunology. Students will engage in readings, class discussions, and laboratory work to learn about viruses, bacteria, other pathogenic organisms, the human immune system, and epidemiology. Along with these activities, students will also design a lab of their own, collect data, analyze the data, and then discuss the findings of their study during a poster session presentation. Along with developing an understanding of immunity and epidemiology, students will more importantly learn to question and hypothesize, identify and manipulate variables, observe, measure and record data, and analyze and interpret results.

### Essential Questions

- What are pathogens? Where do they exist in our world and what affect to they have on living beings?
- How do the many cells of the immune system work in concert to attack pathogenic invaders and keep us healthy? What happens when the immune system fails at its job?
- What is epidemiology? How does the history of disease and illness affect our society?
- *What is public health and why is it important to study?*

### Outcomes

Students in this course should expand their knowledge of the microbiology, epidemiology and immunology, from the viruses to bacteria to T-cells. Along with this content knowledge, students should also be able to perform all aspects of the scientific process. This includes: generating questions, stating problems, creating testable hypotheses, designing and performing laboratory experiments, and analyzing data to establish conclusions. Students should be able to think critically, work cooperatively with peers to solve problems, and manage their independent study time efficiently.

### Instructional Strategies

This course strives to give students with diverse learning styles multiple opportunities to access and demonstrate mastery of the material. Specific strategies include open answer tests (ie short answer), flexible groups, research projects, tiered assignments, creative projects, student-driven discussions, student-interest based teaching, in-class structured work time, primary document analysis, among others.

### Resources and Materials

- **Books**

- *Insights in Biology: Blueprints of Infection*
- **Materials**
  - Notebook
  - Three-ring binder (to hold handouts, reading packets, etc.)
  - Bound Composition Lab Notebook
  - Long pants, closed toed shoes (for lab work)

### Student Assessment

- **Pre-Assessment**
  - Students will take a pre-test on the first day of class that evaluates what they already know, asks them what they expect to learn in the course, and why they decided to take Breakout Biology.
- **Documentation of Learning**  
Students will complete study questions, write lab reports, take quizzes, make presentations, create informative poster boards, and complete group and individual activities.
- **Post-Assessment**  
Students will take a final evaluative test and present one of their projects from the course to families at *Expo!*

### Schedule

<b>Date</b>	<b>Topic(s)</b>	<b>In-class Activities</b>	<b>Assignments/Assessments</b>
<b>Monday, July 18</b>	Pre-Test Course and Expectations What is Immunology? What is Epidemiology? Cell Review	Activity: The Microbes – Infectious Disease Case Study  Disease Transmission	Reading- Bacteria, study questions  Study worksheet
<b>Tuesday, July 19</b>	Quiz: Intro Bacteria Lecture	Bacteria Activities	Reading, Gram Stains worksheet, study worksheet
<b>Wednesday, July 20</b>	Quiz: Bacteria Lecture: Gram Stains	Bacteria disease activity	Reading, study worksheet

<b>Thursday, July 21</b>	Lab: Gram Stain	Viruses Lecture Activity: Build a virus	Reading – Viruses, Gram Stain Lab Worksheet
<b>Friday, July 22</b>	Quiz: Viruses Protists Lecture Protist Activities	Disease Research project  Virus Movie	Disease research
<b>Monday, July 25</b>	Disease presentations	Disease presentations	Immune system reading, questions
<b>Tuesday, July 26</b>	Immune System Be the Immune system!	Immune system – exercise Prep for Antibiotic lab	Search for Cure reading and analysis questions, antibiotic lab hypotheses
<b>Wednesday, July 27</b>	Lab: Antibiotics I, Observe morphology slides	Quiz: Immune system Vaccines Polio Vaccine Movie	Agents of Disease reading and analysis questions
<b>Thursday, July 28</b>	Lab: Antibiotics II Antibiotics	Disease transmission  What else do we want to cover?	Influenza reading Lab report
<b>Friday, July 29</b>	Vaccines	Disease detectives  Public health ad assignments	Public Health ads
<b>Monday, August 1</b>	Public health ads	EXPO project planning  Present Public Health ads	TBD

<b>Tuesday, August 2</b>	Field trip	Field Trip Follow-up	TBD
<b>Wednesday, August 3</b>	Pandemics & Epidemics Disease Detectives	Topic related activities, EXPO projects	
<b>Thursday, August 4</b>	Disease Detectives  Final Evaluation	Finish EXPO projects  Activities: TBD	Prep for EXPO with group members, Essay: What have you learned?
<b>Friday, August 5</b>	Final Activities	EXPO Presentations, Parent Conferences	Have a great rest of the summer!

**Comment on Third-Party Web Sites**

Instructors are required to thoroughly review any third-party web sites they intend to use in their courses for inappropriate content. However, because web content continuously changes, CTD disclaims any responsibility for any of the content contained on third-party web sites used in course materials. If you become aware of anything that may be inappropriate, please notify CTD staff immediately.