

A Simple, No-Cost, Conversion of a Descriptive Lab Exercise to One That Promotes Critical Thinking and Honors-Program Participation

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Our undergraduate microbiology course has historically served 2-year nursing students and 2-year veterinary technology students. The laboratory exercises for this course have largely been descriptive rather than experimental. In an effort to increase the critical thinking skills of our students and to better serve the growing number of 4-year nursing and 4-year veterinary students, I have developed a simple methodology for changing a lab designed to merely sample microbes in the environment to one that answers two basic clinical questions: *How long does a sterile field stay sterile?* and *Which method of hand cleaning (hand washing or alcohol-based hand sanitizer) is most effective?* One hundred students were randomly assigned to one of three treatment groups for each experiment. For experiment one, students exposed sterile nutrient agar plates to the air for 1, 15, or 30 minutes. For experiment two, students placed their index, middle, and ring fingers onto the surface of a sterile nutrient agar plate either after washing their hands with soap and water, using an alcohol-based hand sanitizer, or doing nothing. Plates were incubated at room temperature for one week and then the number of colonies on each plate was counted and treatment comparisons were made and discussed. These two experiments are designed to facilitate critical thinking and allow students opportunity to relate these lab exercises to practical clinical issues. This shift toward more experimental laboratory exercises also provided opportunities for more advanced students to develop research posters which they presented at our college's nascent honors program symposium.

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